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Paper Breaks All Previous Records in 1941

Production of 17,280,000 Tons Exceeds 1940 By 19 Per Cent and Sets All-Time High Mark — Operating Ratio At 97 Per Cent — Writing Paper Output of 735,000 Tons Increased 23 Per Cent.

By M. C. Dobrow, Executive Sec., Writing Paper Mfrs. Association

During 1941 the American paper industry began the transition from peacetime to wartime economy. Because of the increasing demands of the growing Government organizations, the armed forces, export demands and larger needs of domestic industry, production and sale of paper established another new high record in 1941. Moreover, the records of production were higher than anticipated. Machines produced more paper than operators believed possible a year ago.

Total U. S. production of the industry in 1941 is estimated at 17¼ million tons, as compared with 14½ million tons in 1940, a gain of 19%.

For the year as a whole operations in 1941 were 97% of capacity. At the beginning of the year operations were considerably under capacity. In the second half of the year for the most part production was in excess of rated capacity due to new records achieved on individual machines and also to considerable overtime.

Industrial Mobilization

The paper industry is now mobilizing for its part in the war economy. In a war economy a manufacturer obtains his materials at the Government's pleasure and sells his output at prices designated by the Government and to persons designated by the Government. Under such conditions the Government dictates priorities, products, prices and markets. That is the outlook for manufacturing industries, with civilians guaranteed nothing. There are the so-called three C's which dominate the entire industrial picture,—Conversion, Conservation, and Curtailment.

Conversion to war production of plants now engaged in civilian work.

Conservation of raw materials which are needed for war production.

Curtailment of plants which cannot shift and the cutting down of civilian supplies.

Of the 187,000 industrial plants in the nation, it is estimated that only some 80,000 can be converted into war production. Most of the remainder will reduce operations and many of them will go out of business entirely.

Paper is a civilian commodity. Its plants cannot be converted directly into war purposes. However, it is a civilian commodity absolutely essential to the conduct of the war and such civilian business that may be left.

Reflecting the magnitude of the war effort of this country, the figures indicate that in the early part of 1940, 2% of the national income of the United States

U. S. CAPACITY AND PRODUCTION OF PAPER BY GRADES

Grade	1929 Capacity Tons	1929 Actual Production Tons	%	1939 Capacity Tons	1939 Actual Production Tons	%	1940 Capacity Tons	1940 Actual Production Tons	%	1941 (Estimated) Capacity Tons	1941 (Estimated) Actual Production Tons	%
Writing Paper	670,000	607,590	91	747,100	594,594	80	728,190	599,452	82	760,000	735,000	97
Cover Paper	32,000	28,072	88	30,070	19,401	65	34,000	26,944	79	34,000	28,000	82
Text Paper	.....	.....	..	15,000	12,339	82	16,220	11,065	68	16,000	13,000	81
Book Paper (Uncoated)	1,700,000	1,497,912	88	1,921,260	1,534,591	80	1,959,820	1,655,423	84	2,080,000	2,020,000	97
Wrapping Paper	2,000,000	1,605,783	80	2,609,580	2,238,993	86	2,840,220	2,500,818	88	2,925,000	2,860,000	98
Newsprint	1,695,080	1,409,169	83	988,280	954,259	97	1,075,080	1,056,304	98	1,080,000	1,058,000	98
Paperboard	5,696,870	4,451,187	78	7,630,960	6,104,968	80	7,553,770	6,449,548	85	8,250,000	8,020,000	97
Tissue Paper	442,680	387,811	88	792,980	665,723	84	839,790	761,712	91	890,000	870,000	98
Building	850,000	659,178	78	938,370	659,090	70	958,210	682,460	71	970,000	853,000	88
Groundwood	617,850	493,533	80	631,470	540,342	86	617,830	550,453	89	620,000	602,000	97
All Other Paper				252,340	185,342	74	267,840	189,530	73	275,000	221,000	80
Total	13,704,480	11,140,235	81	16,557,410	13,509,642	82	16,890,970	14,483,709	86	17,900,000	17,280,000	97

Courtesy Writing Paper Manufacturers Association

was being expended for defense. In 1941, 17% was being spent. In the first six months of 1942 it will average about 25%, and for the fiscal year beginning July 1, 1942 the figure should be 50% of national income. This will be a long war, a hard war, a war for survival of the military as well as the civilian population. The industrial mobilization which is now taking place must be total and it must be efficient.

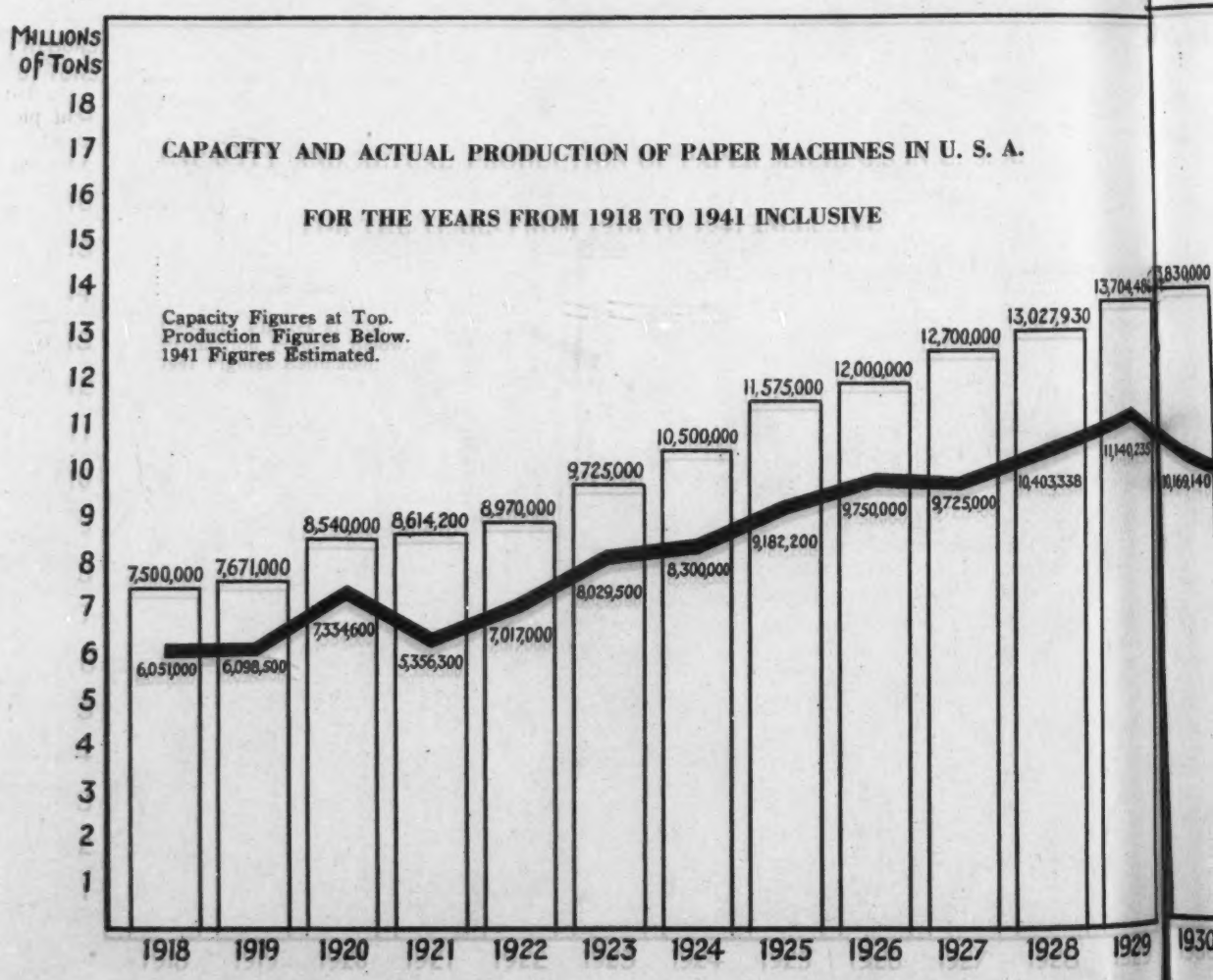
Writing Paper as a War Industry

In 1941 production of all grades of writing paper achieved a new high record in the production of 735,000 tons, an increase of 23% over 1940. Shipments exceeded production, depleting mill inventories by an amount that would require three weeks full production to bring it back to normal levels. At the beginning of 1941 the industry had unfilled orders of approximately 10 days' production. At the end of the year, despite the record production and still higher shipments both from production and inventories on hand, the industry found itself with about 70 days of unfilled orders.

Shipments of all sulphite grades of writing paper, i. e., bonds, ledgers, mimeograph, manifold, papeterie, etc., were 27% higher in tons in 1941 than in the previous year. At the close of last year shipments to the Government were at the rate of 11% of sulphite writing papers produced. When broken down by grades, this presents a somewhat different picture. In the case of mimeograph paper, 25% of the production was going directly to the Government and armed forces. It is expected that this may increase to as much as 40% to 50% of the total domestic output. At the end of last year more than 11% of the sulphite bonds and ledgers was going directly to the Government and its agencies with the expectation that this might be doubled in 1942. More than 20% of the meter and chart paper was going directly to the Government, with expectations that this would be further increased.

In the rag content division of the writing paper industry, because of the relatively smaller tonnage in this group, the demands of the Government have been more important than in any other group. In such specialized papers as blueprint, the purchases of the Government and defense plants for use in war purposes only are estimated to exceed 80% of the domestic production.

As a whole, rag content shipments direct to the United States Government and its agencies at the close of the year were approximately 40% of the total output. 57% of all the rag manifold produced went to the Government. More than 30% of the rag content bonds went to the Government and its agencies.



In addition, 5% of the domestic production of rag content bonds went to China for currency.

Outlook for 1942

Early in 1942 the industry continued to operate on a record basis to take care of all the demands of the Government, its wartime needs, as well as commercial requirements, but, of course, there is no way of knowing that these record operations can be maintained under a war economy. Lack of some essential part of equipment or of some essential material is expected to cause shut-downs on machines here and there. Everyone is mindful of such a situation, but total war requires that the armed forces have preference for all essential metals and materials. The paper industry stands ready to serve the nation's need in every way possible.

Of course, the greatest problem facing the industry in 1942 is an adequate supply of fiber.

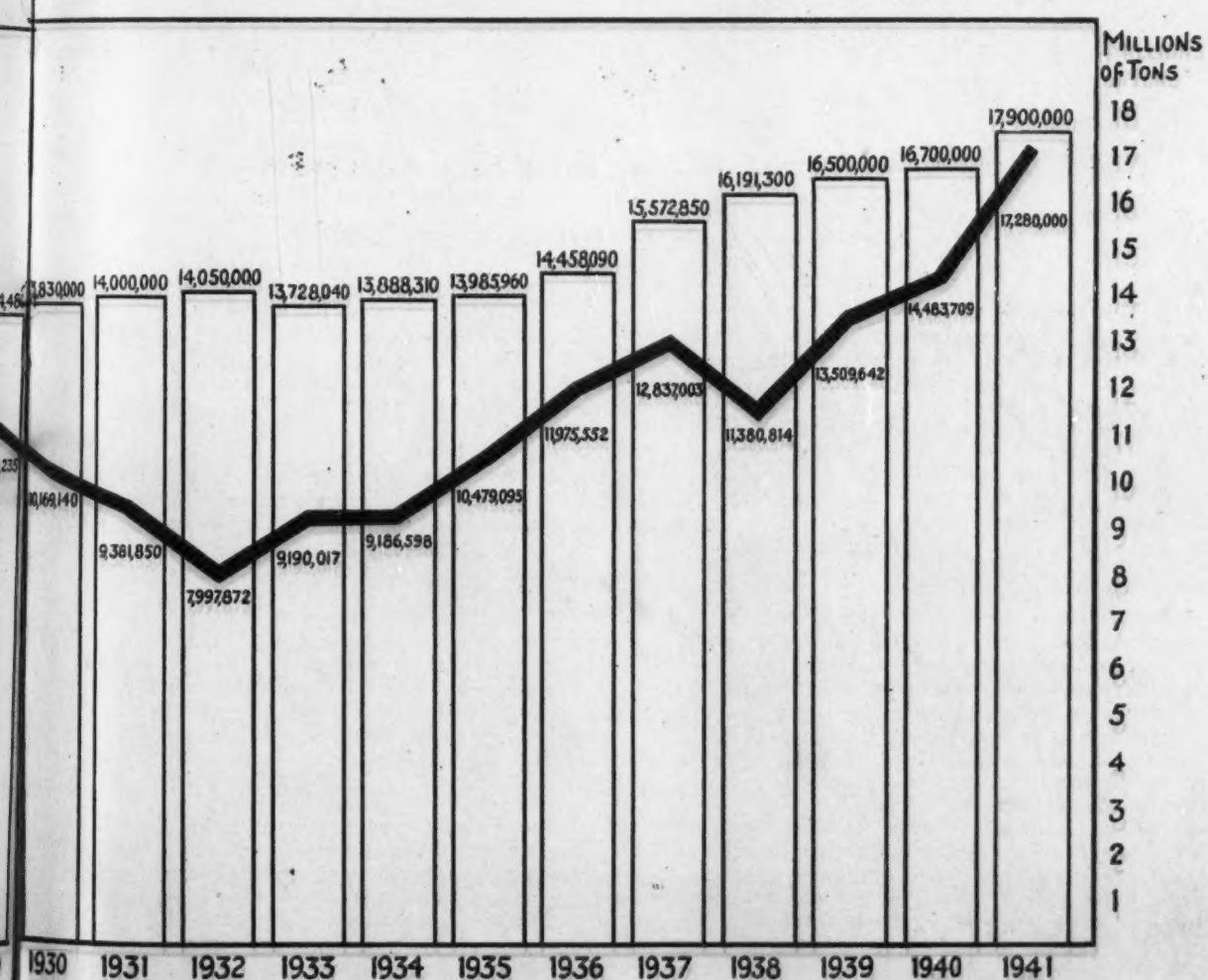
Pulp Supplies and Allocations

Before the war, 25% of the chemical woodpulp consumed in the United States was imported from the Scandinavian peninsula. When the war began in Western Europe, demands of American paper mills resulted in greatly increased shipments from Scandinavian countries. It seemed as if the entire Scandinavian inventory of pulp was transferred to this country.

When the Nazis marched into Norway, thereby cutting off shipments from the Scandinavian peninsula, the mills who purchase pulp in the United States had built up a considerable reserve of chemical woodpulp. In the spring of 1940 this reserve amounted to approximately 850,000 tons. With the curtailment of imports in 1940, these reserves were reduced to approximately 500,000 tons at the beginning of 1941.

In the meantime American pulp mills, the efficient as well as marginal mills, greatly increased production. The same is true in Canada and resulted in tremendous increase in imports from Canada to this country. Domestic production of chemical woodpulp increased from 5,550,000 tons in 1939 to 8,100,000 tons in 1941. Imports of chemical woodpulp from Canada increased from 475,000 tons in 1939 to approximately 900,000 tons in 1941. In fact, the loss of European imports was more than made up by these factors.

On the demand side, however, we had constantly increasing paper production and requirements for fiber. This increase in consumption was just large enough to cause further diminution of reserve stocks. The situation, however, was not nearly as bad as had



been pictured when Norway was overrun. At that time it was feared that many parts of the paper industry would be unable to operate within six months to a year.

Despite the entire loss of European imports, the greatly increased domestic production and imports from Canada have resulted in a further loss during 1941 of only an additional 171,000 tons of pulp as far as the supply for purchased pulp is concerned. To summarize, the net result of all the factors of supply and demand is a loss of reserves in 1940 of 285,000 tons, and in 1941 of 171,000 tons.

To put it another way, the total available supply of pulp for mills who purchase in the open market was on January 1, 1940, 789,000 tons. On January 1, 1941 it was 496,000 tons, and on January 1, 1942 it was 325,000 tons.

There would be no problem of pulp shortage at the moment if new demands had not come into the picture. The United States Treasury called for bids for sizable amounts of pulp to be shipped to England under Lease-Lend arrangements. The State Department called for pulp to be shipped to South American countries under the Good Neighbor policy. Pulp for nitration became a reality with the Army Ordnance requirements of 100 tons a day as a starter, to be increased to 350 tons per day later on. The Army's requirements alone will displace some 150,000 tons of sulphite paper pulp per year. One ton of nitrating pulp displaces about 1.4 tons of paper pulp.

These are important calls on a market now somewhat under demand requirements. It might be said that the new requirements for chemical woodpulp have resulted in changing a near balance market to one of scarcity, with possibilities of actual shortage later in 1942.

As nitrating pulp and Lease-Lend pulp are furnished in large tonnages by comparatively few factors, important dislocation would develop with the paper mills who had relied for their raw material on the mills who were chosen as the Government suppliers. To this end, the War Production Board issued early in January General Preference Order M-52. This order represents the first step in the allocation of sulphite woodpulp to the producers of nitrating pulp to the Government to compensate for the loss of papermaking grades of woodpulp. The allocation order is based on a contribution of approximately 2% to a relief tonnage pool for the customers of the pulp mills concerned. As written the order may provide for increasing amounts of nitrating pulp and pulp for Lease-Lend purposes when and if deemed necessary by WPB.

There is also being considered an over-all pulp allocation scheme. The carrying out of such a plan would require a large staff of administrative personnel both in Washington and in the mills concerned. Any program to allocate the entire pulp tonnage must necessarily result, as has been the experience with other industries so dealt with in Washington, in allocation of the end product as well. In other words, if paper mills requiring pulp would have to send requisitions to Washington, and Washington would parcel out the supply of pulp throughout the industry, it would soon be necessary for Washington, in order to be able to do this job, to find out the most essential uses of the pulp. Then it becomes necessary for every order for paper to go to Washington in order that its preference rating might be determined and pulp allocated on that basis.

It appeared to many in the industry that such a program would not help the war effort; on the contrary, it would create a large amount of red tape and slow up efficient operation of the industry unnecessarily. There was a feeling in the trade that although pulp reserves have been drawn upon continuously, they are still sufficiently large with current production and imports from Canada, despite the nitrating and Lend-Lease requirements, to continue well balanced paper operations that are necessary for Government and civilian needs for at least six months.

Two things are necessary to alleviate the dislocations that have appeared in isolated spots.

First, the allocation of the relief tonnage mentioned above to take care of the nitrating pulp and the Lease-Lend requirements as well. This will spread the burden over the entire industry without the inevitable wide-spread dislocation which would be entailed in an over-all allocation scheme.

Second, the simplification programs which have recently been issued will have the effect of conserving considerable amounts of fiber. The elimination of the heaviest weights and the introduction of non-fibrous materials will somewhat lessen quality, but will spread the available fiber over a greater number of square yards. Further introduction of old papers, of non-fibrous material, and the general elimination of heavy weights in the various grades of paper will contribute to spreading out the pulp supply.

Maine Mill Running at Capacity

Maine's hundred-million-dollar pulp and paper industry, the largest individual source of wealth in the state, turned out the greatest volume of manufactured products of any year in its history during 1941, according to the *Wall Street Journal*. Almost without exception, the big mills making pulp and paper operated at capacity throughout the year. At the year-end, the backlog of unfilled orders was easily as large as the peak in the late spring months. Paper company executives in Maine say business is "too good."

As expected, the threatened shortage of pulp made itself felt by April as the surplus rushed into the United States before the outbreak of war was absorbed. Later in the year the familiar sign of general shortages appeared—curtailment of some civilian uses. Fortunately, the majority of Maine's largest paper mills are integrated; that is, they manufacture their own pulp from timberlands controlled by them or accessible to mills and available for purchase. That is an important consideration.

Few Maine paper company officials care to make a forecast at the start of 1942. But all are convinced that, barring any sudden ending of the war, physical production will again be strained throughout the ensuing 12 months. As for earnings, that will be something else again, they say. Confronting the paper business, like all non-defense industries, will be the necessity of obtaining raw materials needed in the armament program, especially chlorine (which determines the "whiteness" of paper) already being diverted away from pulp purposes into gas. Other sorely-needed chemicals may be short in 1942, too.

Sharply higher federal income taxes, plus excess profits taxes in a few instances, cut deeply into the earnings of most Maine paper and pulp companies last year. At that, probably a majority showed larger net incomes remaining after all charges. Labor, too, took its share of these better returns.

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of equipment for making more and better paper at lower cost per ton

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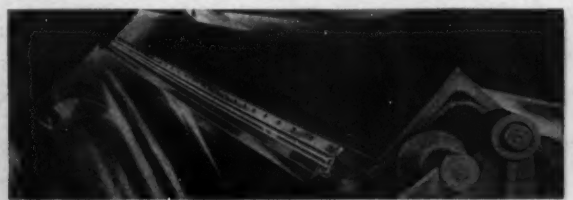
THE VICKERY FELT CONDITIONER keeps your press felts running, eliminates mid-week shut-downs for washing clogged felts—a potent factor in maintaining maximum paper machine output week in and week out.



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Newsprint Output in North America Reached New High Mark

By Royal S. Kellogg, Secretary, News Print Service Bureau

Newsprint paper production in North America really reached a new high mark in 1941 although this does not appear on first glance at the statistics. True, it was 2,000 tons more than in 1940, but the output of 4,786,000 tons was 158,000 tons less than the record output of 4,944,000 tons in 1937. However, as heretofore emphasized, the 1937 production was altogether abnormal and not related to consumption during the same twelve months. A large tonnage went to increase publishers stocks in 1937. This together with a smaller consumption and a decrease in overseas exports in 1938 resulted in a decrease of 1,231,000 tons in 1938 production.

A true comparison of 1941 production is with the average production of 4,329,000 tons in 1937-38 which gives the 1941 total an edge of 457,000 tons over that of three to four years earlier. The most accurate statement that can be made is that output of newsprint paper in North America in 1940 and 1941 was at an all-time high for a 24-month period.

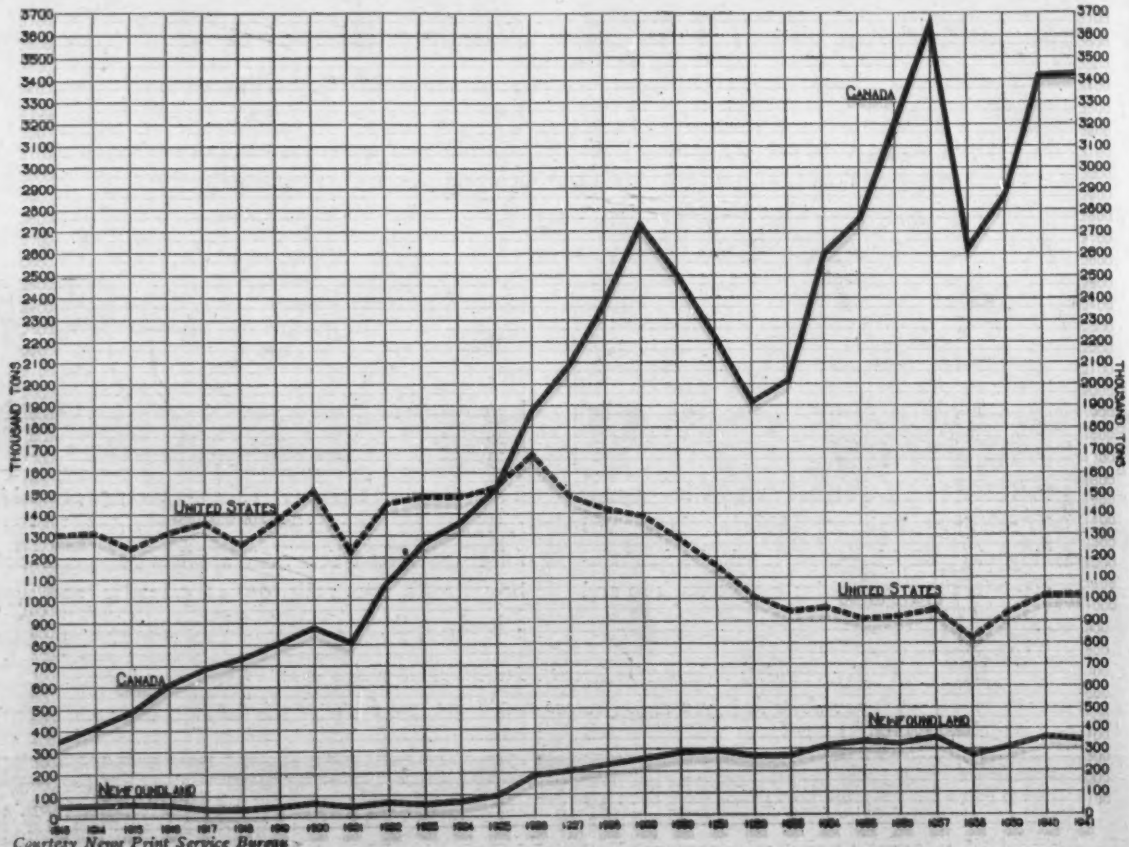
The newsprint mills begin 1942 at practically capacity operation either upon newsprint or other products which they are capable of manufacturing. This is also true of other paper mills.

The 4,786,000 tons of newsprint produced in North America in 1941 was in round numbers made to the extent of 72% in Canada, 21% in the United States and 7% in Newfoundland. These totals were 7,000 tons more in Canada than in the preceding year, 1,500 tons more in the United States and 6,300 tons less in Newfoundland, making a net increase of only 2,200 tons over 1940.

Shipments from the mills during the year exceeded production by 37,000 tons with a corresponding decrease of mill stocks as of December 31, 1941. As of that date mill stocks were the lightest of any December 31 since 1937.

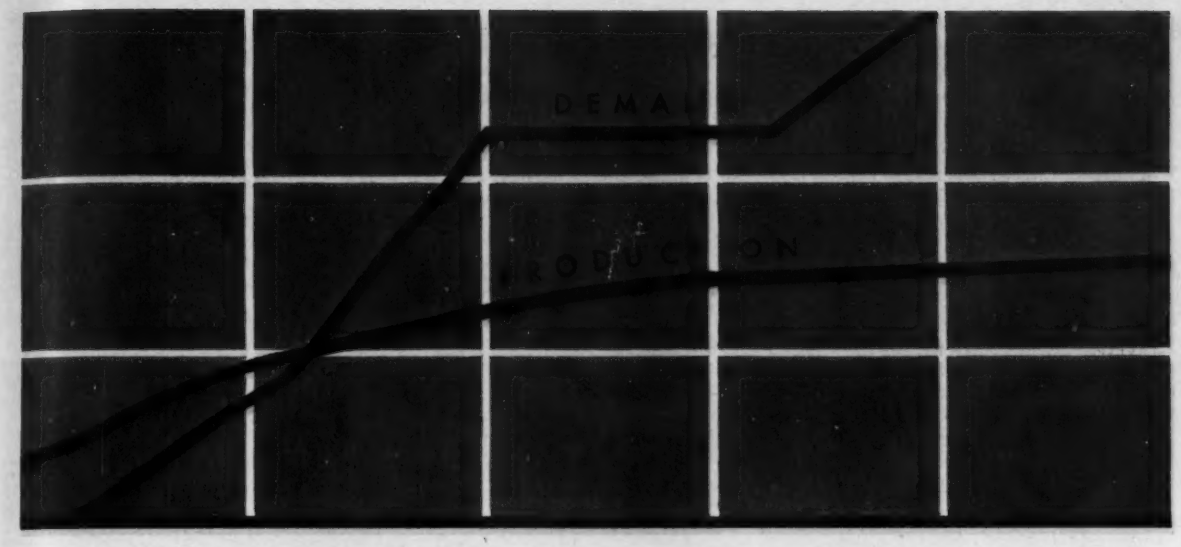
Exports to U. S. 26 Per Cent Higher

Exports of newsprint paper from Canada are reported by Ottawa to have had a monetary value of $154,356,000 in 1941. This was the largest export item in Canada's greatest year in export history with the exception of $161,856,000 for wheat. Moreover,



Courtesy News Print Service Bureau

NEWS PRINT PRODUCTION, UNITED STATES, CANADA AND NEWFOUNDLAND, 1913-1941.



Are your Rubber Covered Rolls a HELP or a HINDRANCE?

May we offer a few simple suggestions that will help you secure maximum service and trouble-free operation from your rubber covered rolls during the emergency period.

- Anticipate your replacement or recovering needs as long in advance as possible to allow for unavoidable delays.
- Schedule grindings for regular intervals to maintain rolls in best condition.
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As rubber roll specialists, we offer you the benefit of our knowledge and experience. Write for bulletin on the subjects of grinding, storing, handling and operating rubber covered rolls and for a supply of Roll Service Record Books which make it easy to keep a complete record of rubber roll specifications and grinding data. There is no charge or obligation for this Stowe-Woodward service.

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THE RUBBER ROLL SPECIALISTS

Newton Upper Falls, Mass.

newsprint contributed 9.5% to the total value of $1,621,000,000 of Canada's export trade last year.

The Dominion Bureau of Statistics reports that there were in round numbers 3,262,000 tons of newsprint exported from Canada in 1941, of which 500,000 tons went overseas and 2,762,000 tons to the United States.

Overseas newsprint exports from Canada, due to war restrictions and hazards, were 24% less in 1941 than in 1940 but were 4% greater than the ten-year average, and to the United States 26% greater than that average. Total exports of newsprint from Canada in 1941 were 95% of production. The ten-year average was 93.5%.

Exports of newsprint from Newfoundland to all destinations amounted to 346,226 tons in 1941 and to 367,174 tons in 1940 .

No monthly reports of imports or exports of any commodity into or out of the United States have been released since those for September, and so far the Department of Commerce has been adamant to all requests for such figures during the time the United States is at war. In this respect Washington is much less accommodating than Ottawa with information helpful to domestic industry and harmful to no essential cause.

For the first nine months of 1941 the Department of Commerce reported a total of approximately 55,000 tons of newsprint paper exported from the United States. If this ratio held during the rest of the year, the 1941 aggregate would approximate 73,000 tons and constitute the largest official record of newsprint exports in any one year since 1919. However, these figures are deceptive so far as exports of standard newsprint from the United States are concerned, since the classification of "news print" in export declarations includes fourteen related items in addition to standard newsprint.

The reports of all the manufacturers of newsprint paper in the United States to the News Print Service Bureau indicate that they exported about 25,000 tons of standard newsprint paper in 1941, and this figure is consequently the one used in estimating the domestic consumption of newsprint.

Consumption Up 3.2 Per Cent

The publishers reporting to the ANPA used, in round numbers, 2,947,000 tons of news print in 1941, an increase of 91,000 tons or 3.2% over their consumption in 1940.

This gain in publishers' consumption was better than it seemed would be the case earlier in the year, since in June and in September there were no increases over the same months in 1940 and in May and October the increase was only 1%. December came along with the largest monthly gain of the year, 7%, due to the great demand for newspapers following the official entry of the United States into World War II. Papers contained more news and circulations jumped, temporarily at least.

But the increase in consumption reported by the publishers does not tell the whole North American newsprint story. The production of 4,786,000 tons plus 3,000 tons imported from overseas early in the year and the known decrease of 37,000 tons in mill stocks make a continental total of 4,826,000 tons of newsprint which went somewhere. Using industry figures because of the lack or insufficiency of official United States data, the following computation appears reasonable:

North American Newsprint, 1941

Supply	Tons
Production	4,786,000
Overseas Imports	3,000
Decrease in Mill Stocks	37,000
Total	4,826,000
Distribution	
U. S. Overseas Shipments	25,000
Newfoundland Overseas Shipments	129,000
Canadian Overseas Shipments	488,000
Canadian Domestic Shipments	197,000
Newfoundland Domestic Shipments	1,000
Increase in Publishers Stocks	56,000(?)
United States Consumption	3,930,000(?)
Total	4,826,000

Lacking information from Canadian publishers as to their consumption, it is necessarily assumed that it was approximately in the same volume as Canadian domestic shipments. The estimate of 3,930,000 tons United States consumption in this calculation is 200,000 tons more than the consumption in 1940 and 100,000 tons more than the previous high total of 3,830,000 tons in 1937. If, however, the newspaper publishers in the United States, as shown by their reports, used only 3.2% more newsprint than in the preceding year, there was evidently a larger increase in paper used for other purposes than strictly newspaper publishing. This is a reasonable assumption because it is known that the strong demand for paper of every kind and the threatened shortage of some kinds have led to a greater use than normal of newsprint outside the printing field. The best estimates are also to the effect that around 100,000 tons of standard newsprint paper were used last year in the production of publications of the shopping news type. This is not an insignificant item.

Notwithstanding last year's record-breaking tonnage consumption of newsprint paper in the United States which occasioned a 2.4 pounds per capita increase over the preceding year, the 1941 per capita of 59 pounds was slightly below the corresponding figure in 1937 and 3.2 pounds below the all-time high reached in 1929.

Circulations Largest Ever Reported

The annual compilation of circulations of English language dailies by *Editor and Publisher* during the twelve months ending September 30, 1941, gives 16,519,000 for morning papers, 25,561,000 for evening papers and 33,436,000 for Sunday issues. This was a weighted increase of 2% over the preceding year and the largest circulations ever reported in every class.

There is no doubt about the continuance of newspaper circulations around their all-time high while the United States is at war.

Advertising Gaining Slowly

The advertising picture continues to be characterized by the same general features as in several recent years. Newspaper and periodical advertising made small gains in total with individual months showing no increase, or in some cases decreases compared with corresponding months in the previous year, while radio almost without exception registered month by month increases.

Newspaper Advertising Increases

Newspaper advertising volume in 1941 was 3.5%

PRECISION-SPEED

NEW CLARK-AIKEN FAST CUTTER is now operating in twelve of the best known bond paper, coated paper and printing plants.

Developed out of experience extending back to 1893, it is setting new standards of precision and speed wherever it is being used.

Believe it — or not —

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NEW FAST CUTTERS

These machines are the last assembled from parts on hand. They will be sold at old prices to the first-come customers.

$4300 F.O.B.
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THE CLARK-AIKEN COMPANY

MAKING GOOD MACHINERY FOR PAPER MILLS SINCE 1828

LEE, MASSACHUSETTS

more than in 1940, but on the other hand it was 10% less than in 1931—and at that time 1931 was supposed to be a poor year in newspaper advertising.

Neither did newspaper advertising in 1941 in any way, keep pace with the increased volume of retail sales as earlier was thought might be the case. Nor is such a relationship likely to obtain in 1942 because with much greater public buying power and threatened shortages in many items, there will be large sales regardless of advertising. The recent weeks in January 1942 were an example. Retail sales ran 30 to 40% over the same weeks in 1941. Obviously there was no such increase in retail advertising.

A study of the volume of newspaper advertising in the principal general classifications in 1941 as prepared by *Media Records* is of interest. The percentage totals in the five general classes come out as follows:

Percent Total

	1941	1940
Retail	58.6	58.0
Classified	20.7	20.7
General	14.8	14.9
Automotive	4.3	4.9
Financial	1.6	1.5
	100.0	100.0

The weight of these classifications in the newspaper advertising total must be borne in mind if the significance of individual statements is to be properly understood. If we say, for instance—as was the case—that retail advertising last year in newspapers increased 4.6% and that automotive advertising decreased 9%—and this was also the case—we would be painting altogether too gloomy a picture. We can also say that financial advertising in newspapers gained 5.4% over the preceding year—and that by itself is too optimistic.

The foregoing tabulation shows the true relationship in that retail advertising makes up about 59% of the total volume of newspaper advertising, that automotive advertising takes but little more than 4% of the newspaper advertising space, and financial advertising only 1½%.

Periodical Advertising Higher

Periodical advertising in 1941, closely following newspaper advertising, was up only 3% over 1940, and in similar fashion it was 7% less than ten years earlier.

The pattern of periodical advertising last year although in total like newspaper advertising, was much more erratic than that in newspapers. For example, there were five months in 1941 in which the volume of periodical advertising was less than in the corresponding months of 1940. There was no such month in newspaper advertising. On the other hand, in September periodical advertising was 11% greater and in December 12% more than in September and December 1940—and here again there was no equal monthly gain in newspaper advertising.

Periodical advertising must of necessity be placed much further in advance than newspaper advertising and these fluctuations perhaps may be taken as evidence of poor guesswork.

All details are not yet available, but the indications are that expenditures by advertisers for radio time in the United States in 1941 were 11% greater than in 1940. This would make the total of such expenditures via the leading chains and other stations close to $180,000,000. It is estimated that radio talent cost $50,000,000 more. Follow-up and other expenditures were also large so it appears that the time may be near when radio will take around $250,000,000 of advertising appropriations yearly. Radio is far ahead of the magazines as the beneficiary of the advertisers money.

Industry estimates are to the effect that there are now 57,000,000 radio sets of all kinds in use in the United States—an increase of approximately 7,000,000 sets during 1941. This does not, of course, suggest a corresponding additional number of radio listeners during the year since many households have several radios plus car radios. It does mean, however, that there are more people in a position to listen to radio wherever they may be than ever before, and to this extent there is an increase in radio coverage.

There will not be any such increase in the sale of radio sets during 1942 because of direct restrictions on radio manufacture and also because of the cessation of sales of new automobiles which under other circumstances might also carry radios.

The outlook for newsprint paper in 1942 cannot be discussed separately from the world war program. Newsprint paper is less likely to be affected by that program than are some other grades of paper. A good deal of public control has already been imposed on some grades. If, when and how such control will be imposed upon newsprint is still a matter of speculation. If Government decides that such control is necessary, it is likely to be imposed regardless of opinion in the industry. There is enough newsprint manufacturing capacity in North America to supply all visible domestic and foreign demand if it is allowed to operate.

There were 40 cases of newspaper suspensions in 1940-41 and 20 cases of newspaper mergers, according to the records of *Editor and Publisher*. On the other hand, the disappearance of several small newspapers is more than compensated for in the newsprint consumption field by the appearance of a new metropolitan daily like the *Chicago Sun* whose requirements are large.

Another factor of some importance in the quantity of newsprint consumed is the evidence that less rotogravure paper will be used and that its place will be taken to a considerable extent by newsprint of slightly better grade than the general standard—but still newsprint.

With the general tightness in the paper situation somewhat more newsprint may also be taken in 1942 for other purposes than newspaper publishing. These items are all on the good side so far as the manufacturers of newsprint are concerned. If there is an increase in the total use of newsprint in 1942, it will probably be due to these factors.

On the less cheerful side is the practical certainty that freight rates will be horizontally advanced between 5 and 10% around March 1, thus adding materially to the delivery costs of paper. There is also the more distant prospect that whatever income may be earned by corporations and individuals in 1942 will thereafter be taxed perhaps 30% more than at the present time.

There is no way of forecasting how much production costs may be increased by the end of 1942. The only certainty is that the longer the war goes on the more they will go up despite all governmental efforts to hold down prices. The best that can be hoped for in that respect is that price increases will be moderate and gradual rather than spasmodic and excessive. The gap between newsprint and general commodity prices is widening rapidly.

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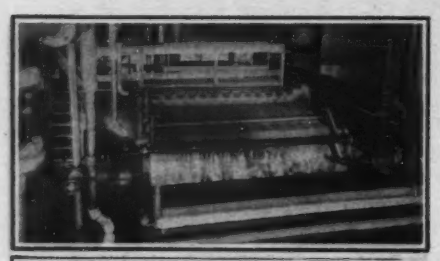
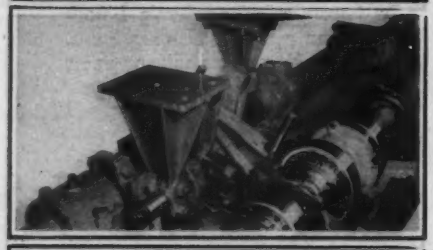


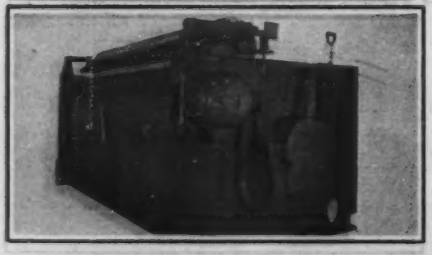
IMPCO Double Valve Vacuum Deckers In Screen Room



Dunbar Flat Screen Drive

IMPCO Black Liquor Vacuum Washers

Section showing Removable end rings to facilitate cleaning



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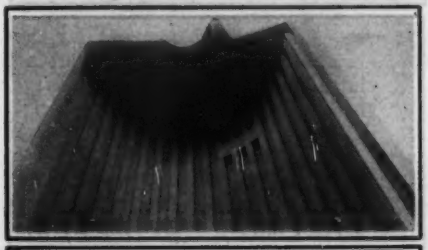
Section showing Swing Agitator Construction



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Pulp Market Felt Pinch in Highest Grades of Unbleached Sulphite and Kraft

By O. F. Swanson, General Manager, Pulp and Paper Trading Co. and J. Anderson & Co.

According to unofficial reports from several sources, more wood pulp was produced in the United States and Canada during 1941 than in any previous year and it is estimated that the production in this country alone will be approximately 9,500,000 tons and approximately 5,300,000 tons in Canada, or a combined tonnage made on the North American continent of about 14,800,000 tons. About 1,000,000 tons were imported from Canada. Several hundred thousand tons were required by the Federal Government for the manufacture of explosives and for shipment to England and South America, under the Lend-Lease and good neighbor policy. This, in itself, should give conclusive proof of the important role wood pulp is playing and has played for several years past in civilian life, and it is now directly connected with the Government in the National Defense Program.

Wood Pulp Now An Important Commodity

When taking into consideration that the art of manufacturing wood pulp on a commercial and economical basis is not yet 100 years old, it can safely be said that few commodities have attained a more prominent position in as short a time. Most of us have undoubtedly read legendary reports on papermaking which, according to them, dates back to ancient civilization and historians claim that paper was made in the Orient about 2500 years ago, but naturally, not from wood pulp. No, the clever Chinese papermakers at that time are supposed to have used several kind of developed fibres, of which silk and strong vegetable fibres were in greatest demand, and the Arabians used linen, hemp, jute, etc.

With the expansion of the paper industry, diligent search for other raw materials became a most vital necessity and, while the treatment and preparation of rag stock was discovered and found very suitable, the search for additional sources of raw material continued. A Frenchman is reported and perhaps, not entirely without foundation, to have found that wood could be converted into pulp for papermaking. Be that as it may, it is quite generally conceded in trade circles that mechanical wood pulp was first made on a commercial basis in the United States, although it has also been reported to have been made in Germany about the same time, but chemical wood pulp was first produced by Daniel Ekman at Bergvik, Sweden. From its inception, the wood pulp industry has recorded constant growth in practically all parts of the world where natural resources made its manufacture on an economical basis possible. Northern countries in Europe, the United States, part of Canada, and practically all wooded sections in the world are now making wood pulp, so that the industry on the whole has attained formidable dimensions.

The greatest developments during the last few decades have obviously taken place in the Pacific Coast region, and in the Southern States. The magnificent mills there are modern to the nth degree and because of the wide range in products manufactured by them, they have reached the enviable but well deserved position of being regarded as leaders in their respective fields. Although originally handicapped in certain sections by the quality of the wood available there, ways and means have been found to eliminate most obstacles and with the constant progress made to date, it is now a matter of time only when the finest qualities of pulp will be made from almost any kind of pulpwood. Some of the highest quality of wood pulp in the world has been made on the Pacific Coast for several years past and the South is already producing excellent pulp for many purposes.

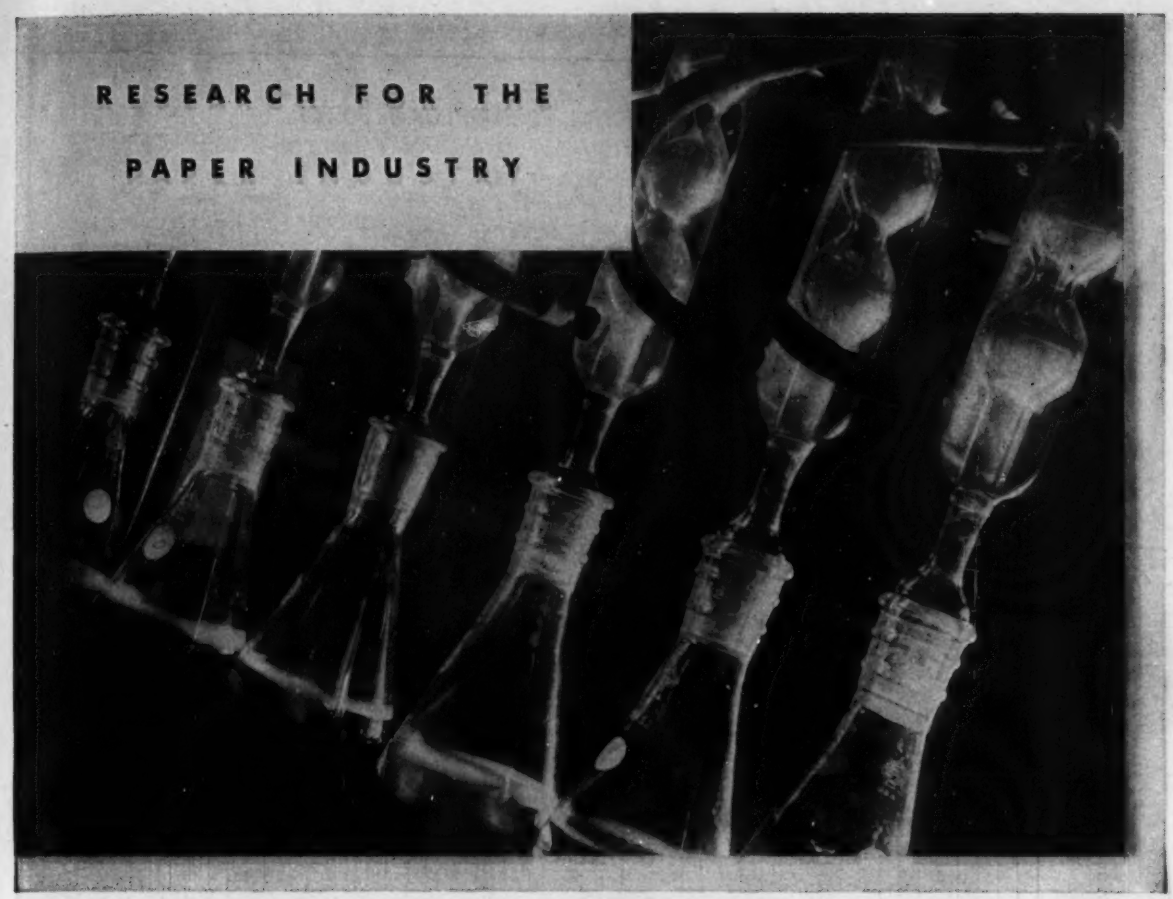
Shortage in Some High Grades Acute

Pulp mills located in the north of the United States and Canadian mills, finding it difficult under normal conditions to compete with the mills referred to, principally due to the higher wood costs, are paying more attention than ever to pulp in the highest bracket, such as real strong unbleached sulphite and kraft pulp of highest quality. Such grades of pulp appear to be essential in producing certain papers and other commodities where a slender but, at the same time, very strong fibre is necessary for obtaining desired results. Despite rather heavy imports from Northern Europe during 1940, there is now a serious shortage in this type of pulp. While such pulp is expensive to manufacture, there is no real reason why it cannot be made here and in Canada eventually, on a much larger scale than at the present. Both countries have the quality of wood required, and this is particularly true with regard to our sister country in the north, where it is in abundant supply. If this matter should ever be given really serious consideration by enterprising American and Canadian operators, it would be possible for the pulp industries of these two countries to supply all pulp required for domestic consumption, regardless of quality.

Supply May Be Uncertain After War

Following the termination of war activities, the problem of exporting wood pulp might develop into a bottleneck because cargoes of other commodities are apt to be given preference. Should this be the case, a substantial tonnage will be released for this market. By this time we know that war makes imperative priorities, allocations, inventory and, to some extent, price and labor control, but isn't it reasonable to reckon that peace will maintain many if not all of these restrictions until humanity has been able to rehabilitate itself? Those in power when peace is finally established, regardless of their political affiliation or economical forces behind them, will keep an eye on what is going on for some time at least, so as to prevent any drastic changes in the program

RESEARCH FOR THE PAPER INDUSTRY



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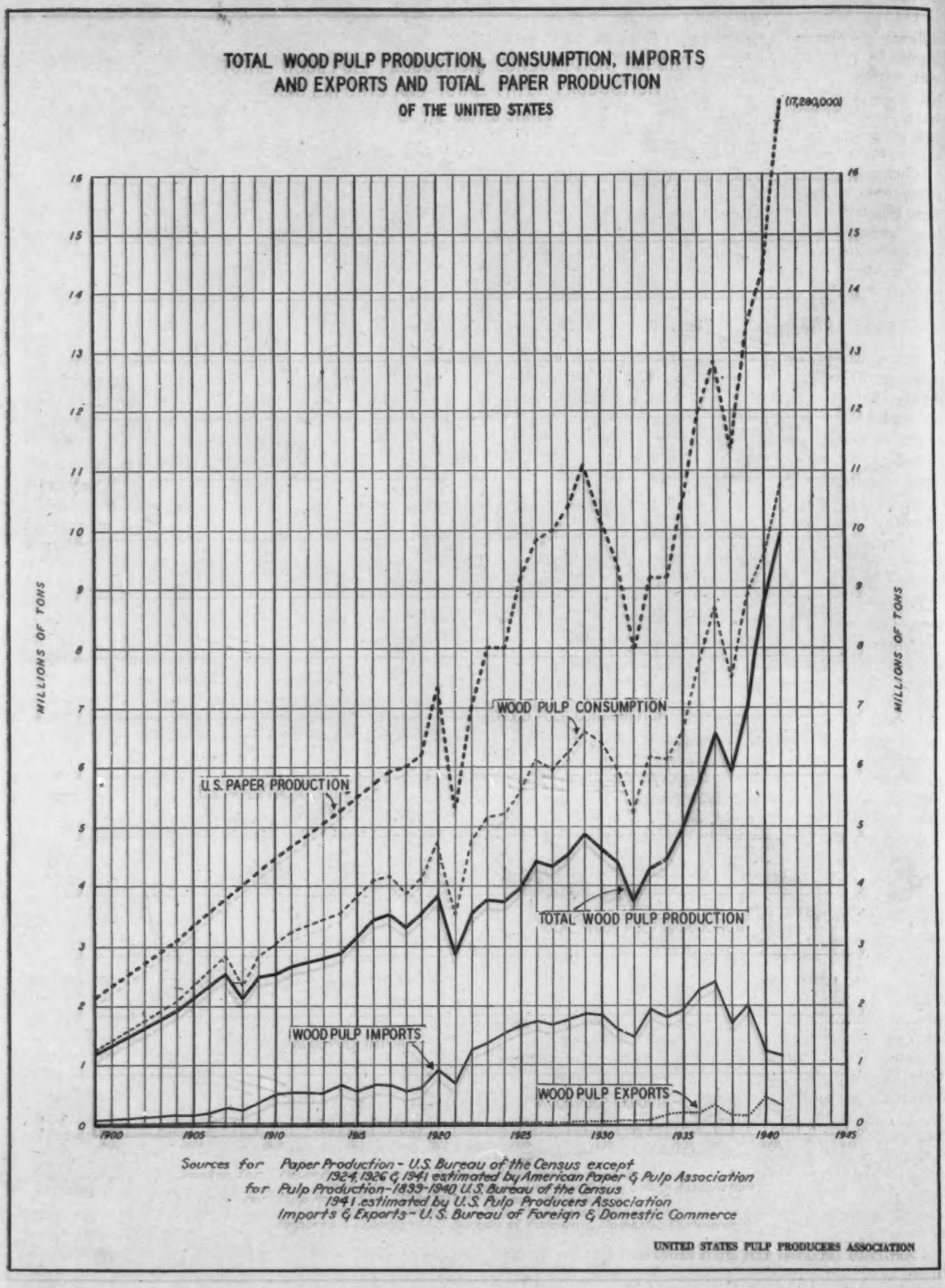
TOTAL WOOD PULP PRODUCTION, CONSUMPTION, IMPORTS
AND EXPORTS AND TOTAL PAPER PRODUCTION
OF THE UNITED STATES
(17,280,000)
MILLIONS OF TONS
MILLIONS OF TONS
U.S. PAPER PRODUCTION
WOOD PULP CONSUMPTION
TOTAL WOOD PULP PRODUCTION
WOOD PULP IMPORTS
WOOD PULP EXPORTS
0
1
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16
1900
1905
1910
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1920
1925
1930
1935
1940
1945
Sources for Paper Production - U.S. Bureau of the Census except
1924, 1926 & 1941 estimated by American Paper & Pulp Association
for Pulp Production - 1899-1940 U.S. Bureau of the Census
1941 estimated by U.S. Pulp Producers Association
Imports & Exports - U.S. Bureau of Foreign & Domestic Commerce
UNITED STATES PULP PRODUCERS ASSOCIATION

of reconstruction and the welfare of all, regardless of race, color or creed.

The price and labor problems will probably be difficult to handle at times, especially if inflation should be permitted to flourish as it did after the last war when, for instance, in the process of deflation, the very finest grades of European chemical pulp were obtained at prices inadequate to even cover the cost of producing low qualities on this continent. Outside of some resales and spot lots of the better grades of chemical pulp, the price structure remained on an exceptionally even keel throughout 1941 but if consumption of chemical pulp continues at the present rate, another 6 months, the anticipated threat of a serious shortage in all grades is well founded and this, in itself, is bound to affect prices, of which the underlying trend is inescapably upward.

Pulp Manufacturers Did A Good Job

In this connection it should be pointed out that the pulp manufacturers did such an excellent job in supplying the customers that the back log of orders at the end of last year was not abnormal. Despite the record-breaking production on the North American continent, the great tonnage produced last year entered consuming channels so rapidly that the inventories at the end of the year are estimated to be considerably lower than a year ago. Should the Government requirements increase more rapidly than the production, it is then natural that less tonnage will become available for division between civilian users.

The purchasing policy of 1941 is still basically sound because, in the final analysis, pulp on hand when needed is of greater importance than the prices at which it was procured. However, this policy is no longer applicable on the whole, on account of allocation and other regulations. Nevertheless, every legitimate effort should be made to maintain adequate but not excessive inventories from the standpoint of protection of all concerned, of which government requirements must necessarily receive first consideration. Paper and pulp are very important war materials, and utmost efforts should be made to drive up or at least maintain production of both as without the necessary raw materials, of which pulp is the most important, paper and board production would be curtailed and, in my opinion, this must not be permitted to happen because the seriousness of the war situation demands increased production.

It is very doubtful that a substantial saving of pulp can be effected, unless it is possible to reduce the weight of paper considerably. If that can be done, then many more square feet of paper can be made from each ton of pulp. I have suggested this method of saving pulp, whenever an opportunity presented itself. Taking into consideration that the pulp manufacturers encountered numerous obstacles last year, many of which they were not at all familiar with, they did, on the whole, a good job, trying to maintain standard qualities and succeeded remarkably well in unbleached pulp but, owing to restrictions on bleaching agents, the color of bleached pulp for papermaking was reduced by from 10 to 15 points and, as many specks are eliminated in the bleaching process, the less bleaching, the more specks in the pulp. In other words, the dirt count in bleached pulp rose considerably in numbers. However, the quality was not detrimentally affected in other respects. If anything, this low bleaching probably increased the strength of some brands, which had previously suffered through over-bleaching. No serious objections were raised to the lower color, as the paper customers and the trade in general soon realized that the manufacturers of both pulp and paper did the best they could, under the circumstances. Without exception, the spirit of genuine cooperation has never been better. Of course, the highlights of last year were centered on war activities and patriotism was naturally an important factor for the existing feeling of good fellowship in business.

The pattern of business that was carried out throughout the greater part of 1941 cannot be used in its entirety during 1942 but events that took place during the last few weeks of the year will largely determine the course to be followed this year. The economy of this country can no longer be concerned primarily with civilian requirements as everything we have, whether wood pulp or anything else, must be brought into harmony with the needs of our fighting forces, and those of our civilians acting in concert with them. This year will represent a critical period and a sharp boost in war production of all essential commodities is to be expected. Everyone expects higher taxes and curtailment in distribution of all materials for civilian use, together with rationing of what we have always regarded as necessities in our present standard of living. Nobody will object to this because we all realize the importance of the task ahead of us, and anything we can say or do to assist in finishing the job undertaken in the shortest time possible is, I believe, what everyone is most anxious about right now. A year ago, we had no priority orders, business limitations, or price ceilings, but we are already becoming accustomed to them and, if the standard of certain commodities, including wood pulp, must be lowered a trifle now and then, there is no use of complaining, but we must try our best to re-adjust ourselves to conditions as they develop.

Little Pulp Received From Overseas

The importation of European pulp came to an abrupt end over a year ago and, with the exception of a few insignificant shipments from Finland, no pulp was received from abroad. In 1940, rather substantial tonnages were expected to arrive from Sweden during 1941 but, owing to manufacturers' inability to make shipments as contemplated against contracts, many were cancelled outright and by mutual consent between buyers and sellers, shipments against other contracts were deferred, pending the termination of the war and, in such cases, subject to mutually satisfactory price agreements at that time. Arrangements of this kind seem to be so indefinite it is difficult to conceive that they will be of any value, when further shipments come up for discussion as, by that time, the allocation of pulp might also include shipments from abroad. It is also possible that the pulp industries of the United States and Canada will then have expanded sufficiently to take care of domestic consumption and, in that event, provisions may perhaps be in force to protect the home pulp industry. The availability of wood and everything else needed for such expansion is here and some day this might be given serious consideration by influential parties in favor of such a move.

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But the responsibilities of quality, capacity and performance have been tremendously complicated by a scarcity not yet fully emphasized by restrictions on tires and other consumer items made of rubber.

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It is no longer a matter of diverting *part* of the supply to the requirements of war production and prosecution, but of allocating *all* the rubber to the single objective of Victory.

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The edicts of necessity are being accepted everywhere with understanding because patriotism expresses itself in cooperation toward the common cause of Victory.

To say "greater care means longer wear" is not enough. MANHATTAN sales engineers are prepared to go over your plant to show how to get the maximum wear and service out of your MANHATTAN Rubber Products — thereby fewer interruptions to the production that will speed Victory.

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KEEP AHEAD WITH MANHATTAN

Kraft Paper Output Sets New High Record and Increases 16 Per Cent in Year

By E. R. Gay, President, Kraft Paper Association.

The kraft paper industry established in 1941, for the third consecutive year, new records for production and sales. Orders rose 22%, production 16% and shipments 19% over the 1940 totals. At the end of 1941 unfilled orders were 76% greater than on January 1, while stocks of finished paper on hand at the mills declined 25% during the same period.

Operations already were at a high level when the year began. Pressure for still greater output continued to increase until, by the end of April, the industry was operating at maximum capacity, limited only by the supply of pulp available for those mills which prior to the German invasion of Norway were dependent upon imported Scandinavian pulp and which are now obliged to seek domestic suppliers.

Had it not been for the substantial increase in productive facilities which had been accomplished since 1936, the industry would have fallen far short of meeting the demands placed upon it during the year. The rapidly advancing defense program called for large quantities of kraft paper, in addition to a considerably increased civilian demand.

Kraft, the strongest of all papers made from woodpulp, has become a necessity to virtually all of the industries contributing to the war effort. There is no satisfactory substitute for kraft paper as a wrapping or packaging material. In addition, kraft paper is required for condensers, for interleaving steel plates, for the waterproof paper which goes in shell cases, to name only a few of its essential war uses.

Furthermore, substantial quantities of kraft paper are now being required for the manufacture of heavy-duty bags to replace the burlap formerly used as containers for agricultural and chemical commodities. Burlap imports have been restricted as a result of the war in the Far East and, of the amount remaining available in this country, a high percentage will be required for sandbags and other military purposes.

Industry Organization for Defense and War

Early in 1941 the Kraft Paper Association was reorganized. Charles W. Boyce, who became secretary in February, was also acting as Assistant Chief Consultant to the Pulp and Paper Branch of what was then the Office of Production Management. In July, Mr. Boyce found it necessary to resign from his Association office in order to devote full time to the

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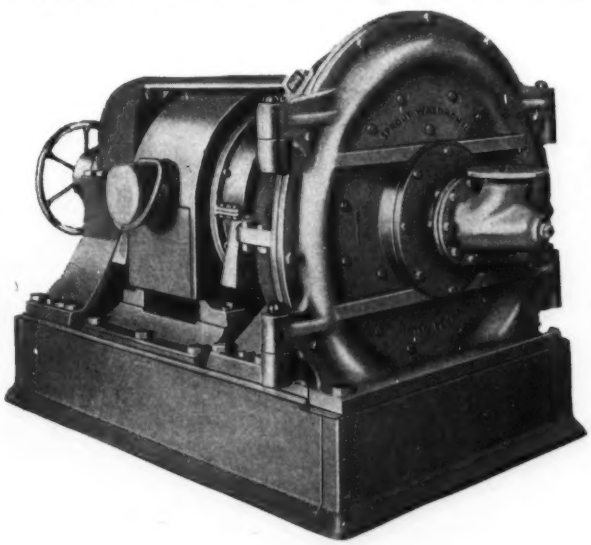

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increasing responsibilities of his work in Washington. He is now Chief of the Purchases and Allocations Section of the Pulp and Paper Branch, War Production Board. Dernell Every, assistant secretary of the association, has since been in charge of the association office.

In September, Norbert A. McKenna, Chief of the Pulp and Paper Branch, appointed a five-man Kraft Paper Manufacturers' Subcommittee. The members of this committee are Messrs. S. M. Phelan, Jr., J. R. Diggs, G. F. Henderson, J. D. Johnston and H. O. Nichols. Mr. I. B. Oseas, counsel for the Association, has acted as counsel for the committee and Mr. Every as secretary.

The committee's first major report, presented to Mr. McKenna in December, was a comprehensive and unique document. For the first time in any division of the paper industry a study was made, machine by machine, to determine maximum production capacity both in terms of square yards and of tons of paper. Analysis of this survey, which required unstinted contribution of time and energy by its members, enabled the committee to present concrete recommendations for the conservation of paper based on factual data from the industry. This report has proved of great value to the Government and to the industry alike.

The association has contributed to the work of the committee not only through financial assistance but also by making available working space, statistical services and trained personnel. The committee has months of work ahead of it, already assigned by the War Production Board, and each week brings new problems on which the advice of the committee is sought.

The manufacturers of kraft paper also have cooperated whole-heartedly with the Office of Price Administration in its work of preventing inflationary price advances. In May, nine of the leading manufacturers of wrapping entered into voluntary agreements with that Office to stabilize the price of standard kraft wrapping paper for the remainder of the year. Again, in December, sixteen manufacturers made similar agreements with respect to this grade for the first quarter of 1942.

Outlook for 1942

For the duration of the war kraft paper manufacturers appear to be assured of continued heavy demand for their product. War requirements are expected to be more than sufficient to offset any reduction resulting from the inevitable closing down of non-essential industries. Indeed, there is danger that the war needs will be so great that they will make impossible and fulfilment of all civilian needs, particularly in the field of retail trade.

The demand for heavy-duty paper sacks, for example, may, according to government estimates, double the quantity of paper converted into such sacks in 1941. This, together with the other war requirements, will involve serious dislocations in the normal distribution of the industry's products. There is every indication to believe, however, that all essential civilian needs, as well as those resulting directly from the war program, will be met.

Productive Capacity to be Increased

There will be further increases in productive capacity in 1942. Once these projects now under way are accomplished, however, it is unlikely that preference ratings for further expansion can be granted. The industry will be called upon, furthermore, to increase its contributions of pulp under the Lend-Lease Act and to Latin America. These contributions, estimated at 225,000 tons for the year, will affect integrated and converting mills alike, since all pulp producers are required to give their pro-rata share.

Repairs and replacements, all the more necessary by reason of the wear and tear of full and continuous operations, may become more difficult in the future. The essential character of the industry's products, however, makes it likely that the relatively small amounts of critical materials required for this purpose will be made available. Transportation, both of raw materials to the mills and of finished goods to the consumer, may well become an even harder problem before the end of 1942, especially in view of the rubber shortage and its effect upon the availability of motor truck transportation.

Whatever problems and difficulties 1942 may bring, I know that the manufacturers of kraft paper will meet them bravely and without fear as to the consequences of the war program upon their individual affairs.

Customer relationships, built over a period of years, will in many instances have to be interrupted for the duration. This sacrifice, unpleasant though it is, is far smaller than those which others less fortunately situated will be called upon to endure. The kraft paper industry can and will make a substantial contribution to the biggest job before us all, that of helping to win the war.

To Supervise Forest By-Products

M. A. Malone, veteran lumber and logging executive at Fort Frances, Ont., Canada, has been appointed supervisor of forest by-products operations for Minnesota and Ontario Paper Company at International Falls, Minn. His appointment was announced by R. W. Andrews, senior vice president of Mando companies.

Until recently Mr. Malone was general manager of Shevlin Clarke Ltd., operations at Fort Frances, Ont., serving in that area and at Rainy Lake, Ont., for more than 30 years.

With M. & O., he is in charge of forest by-products operations, purchases and sales. He will work with the logging department under direction of C. A. Larson, resident manager at International Falls, and also will be in charge of logging and lumber operations for M. & O. mills at Fort Frances and Kenora, Ont.

1941 Book Paper Production

Production of Uncoated Book Paper in 1941 amounted to 1,750,000 tons, which is the largest amount produced in over a decade. While this was 25% over the production in 1937 and 23% over the production in 1940, it was slightly less than the full six-day week capacity of the Book Paper mills. Shipments of Uncoated Book Paper were slightly greater than production.

Coated Paper production in 1941 amounted to 352,000 tons, which is some 9% over the production in 1937 and 36% over the production in 1940, shipments being approximately the same amount as production.

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Paper Board Production of 8,000,000 Tons Shows 27 Per Cent Increase in Year

By Grafton Whiting, National Paperboard Association.

The paper board industry in 1941 experienced the same unprecedented demand from both civilian and defense sources that was met by other essential industries. The fact that paper board is an essential product has become more and more pronounced as the requirements of the fabricators of shipping containers and other types of packaging have mounted steadily. The defense demand for paper board has been due largely to the needs for packaging of food stuffs and other items called for under the Lease-Lend program for shipment abroad; the needs of our armed forces for food, clothing, equipment, etc.; much of which must be put in suitable containers for shipment and storage; the call for fiber shells and other types of containers for shipment of ammunition and many items that form a part of our armament needs.

At the same time, the upturn in general business activity has increased the civilian demands as purchasing power throughout the country has mounted with rising wage rates, more hours of employment and more men at work. With money to spend, the buying of all commodities has been stepped up; a condition which quickly reflects itself in greater production and need for more packaging materials.

That the paper board industry has met this situation is evidenced by the fact that production during 1941 is close to 8,000,000 tons; an increase of over 27% above the 6,276,000 tons made in 1940, the previous all-time high. For the past seven years, with the exception of 1938, paper board production has made successive and substantial gains and now in 1941 is more than double the output of 1934.

Per Capita Consumption Up Sharply

The per capita consumption of paper board is another means of viewing the growth of the industry. By using the total population as a divisor and expressing the results in pounds, the average use per individual is shown. In 1923 this stood at 50.3 lbs., in 1930 at 65.1, 1940 at 96.3. With the marked increase in tonnage for 1941, the per capita use is computed to be over 120 lbs., more than double that of 1923.

It is not possible to draw a line between civilian demand and defense requirements, since paper board mills are the suppliers of the board used by fabricators of corrugated and solid fiber containers, folding and set-up boxes and miscellaneous items. Board thus furnished may be used by customers of the fabricators for any purpose, and the grade or type of board is not necessarily a clue to its ultimate use. However, two broad classifications can be made, namely; container board and boxboards. So many of the items for defense call for packaging for shipment, that it is the container boards that have gained most in comparison with previous years. The table below shows the relative amount of production for the major classifications and subdivisions of each for the past two years.

	1940			1941	
CONTAINER		50.2%			51.7%
Liners—Kraft	59.5	31.3		58.1	32.1
Liners—Jute, Etc.	40.5			41.9	
	100.0%			100.0%	
.009 Kraft	32.3	14.4		28.7	15.0
	67.7			71.3	
	100.0%			100.0%	
Chip		4.5			4.6
BOXBOARD		49.8%			48.3%
Folding		22.3			22.2
Set-up		9.4			9.5
Other		18.1			16.6

In 1940 container boards represented 50.2% of the total output, with 49.8% for boxboards; whereas in 1941 the comparison was 51.7% and 48.3% respectively. This change, while significant, does not reflect the impetus given by the defense demand which occurred largely towards the close of the year. During the fourth quarter, the relation stood at 53.3% for container boards and 46.7% for boxboards.

If the gains are viewed from a tonnage basis, it is found that container grades were 31% above 1940, but the defense program was steadily increasing its take of container output, and each month shows more demand upon the mills for liners, corrugating material and chip. During the last half of the year, the gain in container grades was 36% and for the last three months of 1941, 41%.

Boxboard grades, while showing a decrease in relation to the production as a whole, do have a share in the demand for defense purposes. Many items call for individual packaging and small parts requiring protection are placed in folding or set-up boxes and these, in turn, are put in shipping containers for transportation. Boxboards gained 23% over 1940 for the year, with 32% during the second half year.

Raw Materials

The two principal raw materials—pulp and waste paper—used in making paper board, have undergone a change in the relative amount put into the average furnish. During the first four months of 1940 an ample supply of pulp was available and but little change from past performance was made. In April, European imports were cut off and by the second half of the year pulp was less plentiful. Gradually, the substitution of the better grades of waste paper was made, partly to replace new pulp, and this practice has continued in 1941. In the average furnish, three to four per cent more waste paper stock is being used, which permits a reduction of some 15% in the amount of pulp required.

Woodpulp

In April, 1940, when the importation of European pulp was cut off, some forewarning was had, but it was insufficient to make much if any preparation to meet the conditions. The pulp mills here and in Canada were faced with the problem of supplying what Europe had been sending, and in addition, enough

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Without "time out" for maintenance or repairs, G-E turbines keep going to meet today's demands for continuous performance. They keep going even when adverse operating conditions exist, such as unusually high ambient temperatures or excessively moist atmospheres. And, in dual-drives, turbines either pick up the load instantly when called upon to do so or divide the load with the motor for the most economical heat balance.

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Because of their adaptability to any speeds within wide limits and the availability of reduction gear units, turbine drives permit operation of the driven equipment at its most efficient speed. Turbines built for one steam pressure can usually be adapted to another pressure by minor changes.

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Take out one linkage pin, remove eight bolts, lift the valve bonnet—in less than two minutes you have completely exposed the inlet valve for inspection. Want to clean the steam strainer? There's no need to break the station piping or remove the governor valve in the improved Type D. Does the carbon packing need adjusting? Detachable boxes and garter springs make it easy. All pipe connections are made to the lower half so that the cover can be easily removed for inspection of internal parts.

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For what you would pay for an ordinary turbine, you can obtain a Type D with positive overspeed protection, improved bearing cooling, and built-in throttle valve. Remember, production line manufacturing, made possible by the widespread demand for this turbine, means more for your turbine dollar.

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It's attention to details that builds reliability—and keeps maintenance costs low—in G-E turbines. Bucket and valve materials are carefully selected for resistance against corrosion and erosion; bearings are water-cooled to give low operating temperatures; packing glands are made of carbon for long life and infrequent attention.

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GENERAL ELECTRIC

pulp to meet the growing demand. In 1939 European imports amounted to 1,388,500 tons, or 15% of our needs. Fortunately, ample inventories were available to serve as a cushion while American production was being built up.

Domestic production of pulp during 1940 increased by 26.8% over 1939 and for this year a further gain has been made over 1940. Imports from Canada gained 30% in 1940 over 1939, and this year show an additional gain over 1940. Exports are less, due largely to the stoppage of shipments to Japan. The inventories of pulp on hand are reduced to an expression of months' supply as a simple gauge of the amount held. In April 1940 when European pulp shipments were cut off, the records stood at four months, whereas on January 1, 1942, two months' supply remained. This reduction of two months represents the extent to which the American supply has been insufficient to meet the consumption demand. At the present time, through greater production in domestic mills, larger Canadian imports and the increased use of waste paper stock, the situation is improved.

Waste Paper Stock

The increased use of waste paper stock as a substitute in part for new pulp, and the large increase in production, have brought about a demand in excess of supply. This has caused a sharp reduction in previously held inventories and made necessary some curtailments of production due to a lack of this essential raw material. The paper board mills, recognizing the seriousness of the situation, have inaugurated a program of waste conservation entailing an expenditure of some $430,000 to impress upon the public that waste papers are of value and needed as a part of our defense efforts.

The paper board industry consumes about 85% of all of the waste paper that is used and the supply has become the prime factor in the effort to maintain full production.

For the first part of 1941, receipts and consumption were closely in balance, but it soon became evident that with the requirements of the mills and the reserve plants coming into operation, more waste paper would be required, which would be accompanied by sharp price increases. Under these conditions, and to prevent a runaway market, price ceilings were placed upon all grades of waste paper; first as a voluntary agreement and later in published form. That such a market would have occurred is evidenced by the fact that from July 1st to November 1st, while the average receipts showed a gain of 8%, consumption jumped 15% and inventories dropped 36% from the January 1st level.

During the last quarter of 1941, due to the efforts to increase collections, the incoming supply has gradually increased and is now approaching the requirement including the recent expansion in paper board output.

Orders

Incoming orders represent the demand for paper board, and production is the fulfillment of such orders. The balance between the two is the backlog of orders remaining unfilled. To obtain a simple figure for statistical comparison, the ability to produce—expressed in tons—is divided into the tons of unfilled orders to give the "Days to Run". During 1940 the average days were 6.4, with an variation of but three days up or down throughout the year. 1941 opened with 5.3 days and almost at once orders began to mount under pressure of the heaviest demand ever experienced in the industry. Not until August, with the "Days to Run" standing at over 20, was there any sign of leveling off and on January 1, 1942, with the peak passed in October, there remained 19.7 days to run.

Had it not been for the added production from the bringing in of idle machines held in reserve, the days to run would have advanced still further. Imports now coming in from Canada are helping to supply the demand. During the past 10 years there have been but three periods when demand rose rapidly. These were in 1933, 1937, and the fall of 1939, but each was of short duration—3 to 4 months. The present strong demand has been in existence for over a year and the end is not yet in sight.

If January 1942 is contrasted with January 1941, it is found that unfilled orders are three times greater; the days to run stand at 18.8 compared with 6.0 days last year. The duration of the high level of unfilled orders depends upon the volume of incoming orders and the amount of production. Civilian demand and defense requirements are expected to continue at a high level, but the volume of production is also reaching new highs.

Activity

Activity is based on running time and not on tonnage. Six days or 144 hours per week is considered the base, equal to 100%. By dividing this base into the hours actually operated, the per cent of activity is found.

For 1940 the activity was 78%, with an average daily output of 25,800 tons. During 1941 the activity was 92%, with a daily average output of 27,300 tons. The opening of idle mills formerly held in reserve has increased the per cent of activity, but tended to decrease the average daily output per point of activity because of their slower rate of hourly production. On the other hand, the ample backlog of orders and increased efficiency throughout the industry has brought the net result well above a year ago.

Production

Production of close to 8,000,000 tons for 1941 is at the rate of over 150,000 tons per week compared with 120,400 tons in 1940. This output was accomplished by increased hours of operation and greater efficiency. Moreover, during the year there were brought into production 13 plants formerly held in reserve. These, together with other idle machines, make a total of 19 more machines now in operation. In addition, 3 mills not previously producing in this field are making paper board.

Exports of kraft container boards for the first eight months in 1941 were 25,000 tons compared with 78,000 tons in 1940. The Department of Foreign and Domestic Commerce from which this information was obtained, has recently announced that no further publication of these figures will be made.

Imports of .009 corrugating material from Canada started in August, 1941. This is a special sheet made by newsprint mills in Canada using a combination of pulp available from excess newsprint pulp capacity. The total imported is some 100,000 tons for 1941.

Each year it is found that the average daily production per machine is stepped up 3 or 4% due to mechanical improvements and increased efficiency in the mills. 1941 showed such an improvement and 1942 should experience an even greater advance.

On this anniversary, we renew our pledge to live up to the rigid principles established by our founders, a century ago.

That means that you will continue to receive the same high quality and the same dependable service that have been maintained in the past.

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Springfield, Massachusetts

Prices of the finished product and of the principal raw materials now have ceilings set for them by the Government. Pulp is the one exception, but an understanding between the producers and the Government places this in practically the same category.

Paper board prices, according to the Official Board Markets, opened in 1941 at the same level as for the last quarter of 1940. By the middle of the year, due to the increase in waste paper prices, prices rose $5.00 or more and were headed strongly upward. In June a voluntary agreement was entered into with the Government stabilizing prices, and on October 1, with certain revisions, a Price Schedule was issued.

Outlook for 1942

Efforts are now being made to conserve paper board by the reduction in caliper and the redesigning of containers and cartons to produce the same number of units with a lesser amount of paper board area. In the aggregate, this should amount to a considerable tonnage applicable principally to civilian demand. On the other hand, purchasing power and national income are increasing, and this means added purchases of the many commodities packaged in paper board. A reduction in the output of non-defense manufacture has already begun and a shifting of labor to increased defense output is taking place. However, the wages paid constitute purchasing power regardless of the source from which they come. Defense material is stepping up as the tempo of the defense program increases, and the necessity for full time operation for many months to come is evident.

Crown Zellerbach Forestry Program

SEATTLE, Wash., February 14, 1942—To facilitate its rapidly developing forest management program for guaranteeing adequate supplies of pulp timber for its numerous pulp and paper mills in Washington and Oregon, conifer and hardwood seedlings from the co-operative Forest Products Industry tree nursery at Nisqually, Wash., are to be taken at the rate of one million trees annually, Don S. Denman, vice president of the Crown Zellerbach Corporation, states.

To Total Over Six Million Trees

These trees, in addition to purchases being made this year for a plantation on a sustained yield tract near Neah Bay, Wash., will bring the total plantings to about six million trees within the next five years, in addition to expanded fire protection facilities of areas where trees are re-seeding naturally, said Mr. Denman.

Orders placed recently for first deliveries from the new Nisqually nursery will be for Douglas fir, hemlock, spruce, Port Orford cedar, with a quantity of maple and alder for planting along the 40-mile shoreline of Lake Siltcoos, Oregon state, where a large hardwood and conifer planting will be started this winter and continued next year.

"Crown Zellerbach Corporation officials have geared the forest management program up to a point where it may be safely said that within five years we will have trees growing on all properties considered by our forester as adaptable growing sites," said Mr. Denman. "While Crown Willamette, a predecessor company, was a pioneer in nursery, reforestation and selective cutting in Oregon state, Crown Zellerbach Corporation is going a step further. Axel J. F. Brandstrom, Portland, graduate of the College of Forestry, University of Washington, is now forester for Crown Zellerbach. For the past year he has been making studies and perfecting a master plan for placing the corporation's Oregon and Washington forest properties on a sustained production basis. For several years Mr. Brandstrom was in charge of forest management experiments for the United States forest service, has studied forest management in North America and abroad, and has written several important treatises on the subject.

The Crown Zellerbach Corporation has joined with a number of other operators in financing the Forest Products tree nursery, which is located along the four-lane Pacific highway.

Supervised by Graduate Forester

The nursery is being developed to produce five million tree seedlings annually, and these will be planted by the co-operating forest operators on lands where re-seeding has not taken place naturally. Seeds for the Nisqually tree nursery are to come largely from the Granite Falls area in Snohomish county, Washington. The Granite Falls strain of seed has been accepted by the leading forest nurserymen and forest planting experts of the Pacific Northwest as being the best all around seed for insuring germination in the nursery and subsequent survival after the trees are outplanted on areas denuded by forest fires.

The tree nursery will be supervised by two graduate foresters experienced in growing and planting nursery stock. Charles Reynolds, a graduate of New York State College of Forestry at Syracuse University, will head up in the industry's nursery technical staff and Robert Gohrman, a graduate of the College of Forestry, University of Washington, will assist him in the technical and administrative duties arising from the development and operation of a forest tree nursery. The nursery will require 12 to 15 additional employees for developing the nursery site. After the initial development, many of these employees will be used for the regular operations of sowing the seed in the seed-beds, weeding the seed-beds after the seeds have germinated, fumigating and spraying the little seedlings against the ravishes of fungi and insects, pruning the roots of the seedlings to help develop a better system of lateral roots and lifting the seedlings for transportation to planting sites on the holdings of companies buying the stock. The employees will be local Nisqually residents, employed on a seasonal basis.

To Raise One-Year and Two-Year Seedlings

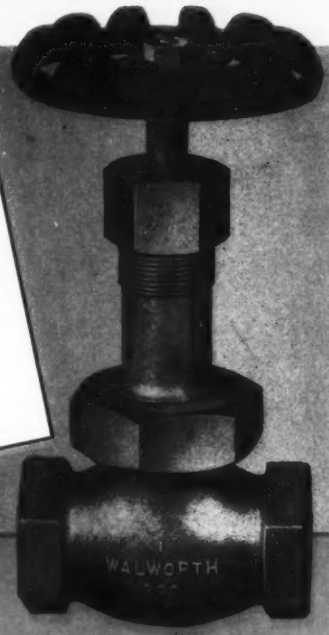
Both one-year and two-year seedlings will be raised. The one-year seedlings are sowed in the spring and lifted for outplanting the following autumn or spring, while the two-year seedlings are those which result from seed sowed one spring and lifted two autumns or springs hence. The one-year seedlings are not root-pruned and are about three to four inches tall when transplanted in the woods. Two-year seedlings are root-pruned during their first year in the seed beds and are from seven to ten inches in height when outplanted.

5 MINUTES RE-GRINDING...NOW!

MAY DOUBLE THE USEFUL LIFE OF THAT VALVE

Today, more than ever before, it is important to get the longest possible life from every valve. Walworth is publishing this simplified method of re-grinding in the hope that it will enable customers to prolong the useful life of their valves. It is important that your valves be re-ground as soon as a leak, however small, is discovered. Continued use without attention may result in a cut so deep that it cannot be removed by grinding. Walworth Re-grinding Valves are designed to be re-ground without removing the body from the pipeline.

Before taking the valve apart, empty the pipeline. This may be done by closing the next valve on the upstream side. Unscrew the union bonnet ring and lift the bonnet assembly.



1 Place a pin or nail through the hole in the lower portion of the stem. This hole will be discovered by revolving the disc until the slot in the disc locknut is directly over the hole. With this pin in place the disc and stem are locked together.

2 Apply grinding compound to disc and seat with finger. It is recommended that a grinding compound with an emery base be used.

3 Place bonnet assembly in the body. Hold the bonnet and revolve the hand wheel until the disc touches the seat and until the bonnet is raised about 1/32 inch from the body.

4 Screw on union bonnet ring to hand tightness and then back off about one turn. Oscillate the hand wheel with one hand, meanwhile holding the union bonnet ring firmly to keep it from turning.

5 After pitted surfaces are ground smooth, wipe seat and disc with a cloth that has been dipped in gasoline—be sure all grinding compound is removed from the parts.

6 IMPORTANT! Remove pin from hole in shaft before reassembling valve.

WALWORTH 1842 1942 VALVES AND FITTINGS 100TH ANNIVERSARY

THIS IS OUR CENTENNIAL YEAR

This year marks the 100th Anniversary of the founding of our company, and we had a nice series of "institutional" ads in mind to tell you about it. We hope you saw the first one, which appeared in the January trade publications. Needless to say, that ad was prepared before December 7, 1941, and things have happened since then.

Advertising is conceded to be the most economical means of telling a message to the greatest number of people, and in this period of Priority Production we feel that it is the duty of Walworth advertising to cooperate in a national program of Salvage, Simplification, Specification, and Substitution.

So we've scrapped the "institutional" ads we had planned for our centennial year, and present a series of ads which we think will help valve and fitting users get more service from their existing Walworth material and thereby permit the output of our five plants to be used to the best advantage for Victory in the great national effort.

WALWORTH

VALVES FITTINGS and TOOLS
Backed by 100 Years' Service

WALWORTH COMPANY
60 EAST 42nd STREET, NEW YORK

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Paper Industry Shows Stability and Steady Expansion in Century of Progress

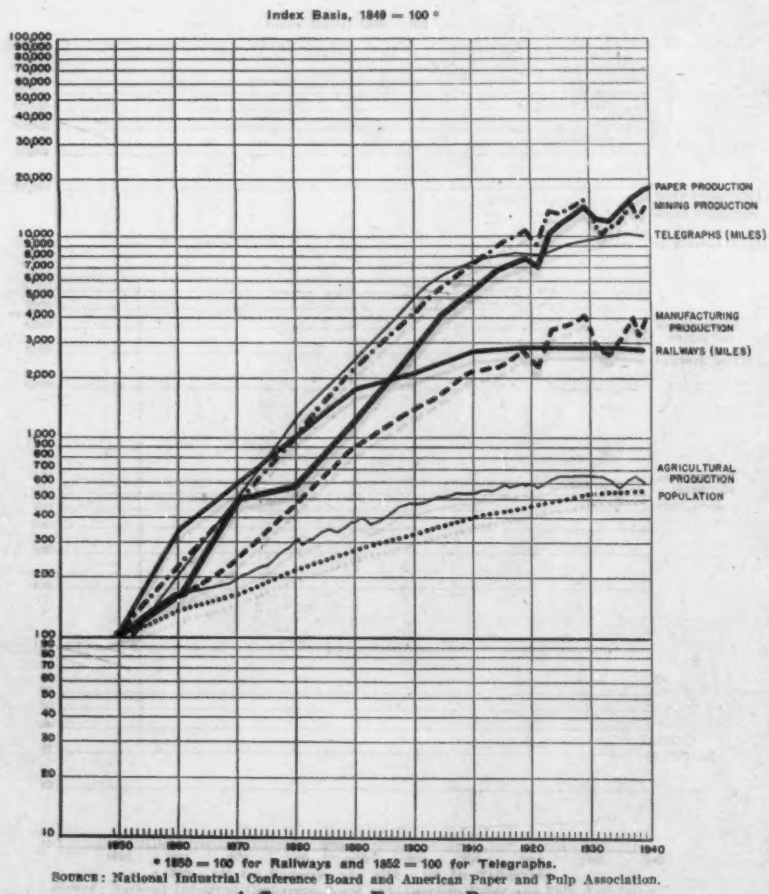
Paper manufacturers have good reason to feel gratified at the excellent progress made especially in the last quarter of a century. In this period, the utility of paper has been increased and widely expanded. Industrial progress in the United States has been remarkable and incomparably greater than in any other country. This is applicable to the paper industry and to other major fields of production.

Steadily Increasing Demand

The steadily increasing demand for raw paper and its adaptability for processing and fabricating, has been a strong incentive for the industry to continue its steady expansion of facilities for the production of paper and paper board. In common with some other progressive, major industries, the steadily increasing capacity and production of the paper industry has been in substantial part due to the adoption of scientific methods. The application of high engineering standards has been widely utilized. The valuable contributions of chemical engineers within the industry have accomplished so much that it would be difficult to evaluate the varied benefits derived from this source. In addition to this research work and study, industrial, electrical, and mechanical engineering have likewise contributed generously to the paper industry. And, of course, the important contributions which individual manufacturers and their personnel of paper makers have made, while less widely known, have and continue to make the record of the manufacture of paper a notable example of industrial progress.

The production figures of the paper industry from year to year presents an impressive and authoritative record of the growth of the industry. The history of the past quarter century or so affords the best comparisons, not only for chronicling the production of the industry itself, but setting beside it some other major industrials as a general measurement of the progress of all. Such a comparison is shown in the accompanying chart prepared by the American Paper and Pulp Association.

An examination of this chart reveals that in its century of economic progress, the paper industry has shown a more rapid and sustained growth than many other of the older major industries. As the census of manufacturers is taken by the government biennially, no government data for the year 1941 is available at this date. In 1941, however, under the urgency of increasing production for defense and later for the war effort, production of all major sources of production have been greatly expanded.



* 1850 = 100 for Railways and 1852 = 100 for Telegraphs.

SOURCE: National Industrial Conference Board and American Paper and Pulp Association.

A CENTURY OF ECONOMIC PROGRESS

Few, if any, of the older and larger industries in the United States have experienced a rate of growth as rapid and sustained as that which has occurred in the paper industry during the past one hundred years.

Consistent Expansion

The progressive character of the paper industry is well shown by the consistent expansion recorded in the figures of capacity and production. For example, in 1899, production of all grades of paper aggregated 2,167,593 tons, against a capacity of 2,782,200 tons. In 1914, production totaled 5,270,047 tons; capacity, 5,293,400 tons. In 1924 production had increased to 8,300,000 tons; capacity, 10,500,000 tons. In 1934, protion was 9,186,598 tons; capacity, 13,-

Leading Mills Speed Production

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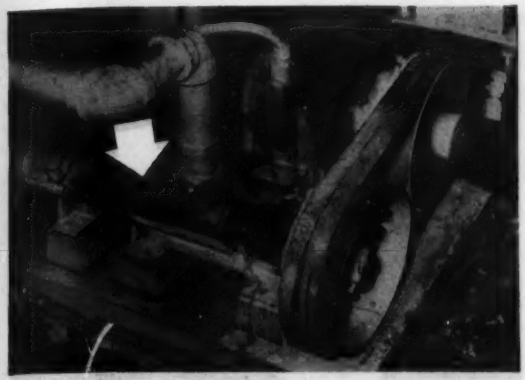
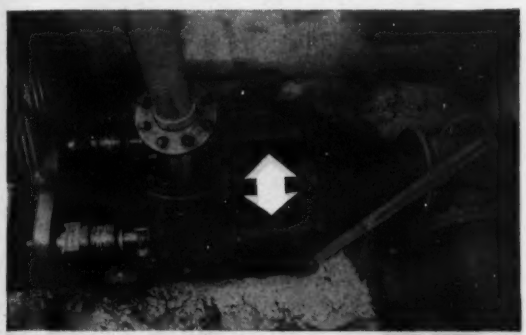


Recently installed in new Texas plant.



Doing double duty in an Ohio mill.

Under grueling working conditions . . . in leading paper mills everywhere, R & M Moyno pumps are performing difficult pumping jobs . . . giving trouble-free service . . . reducing costs . . . improving finished product quality.

The R & M Moyno is the proved, profitable answer to *your* pumping problems. It is valveless, self priming, positive in displacement . . . handles coating solutions up to 53% solids, delivering a uniform discharge at constant pressure without agitation or cavitation.

Investigate the R & M Moyno pump today. An R & M field expert will analyze your pumping problems without obligation . . . and may help you save thousands of dollars. Write now for R & M Pump Folder No. 1777.

Saving time and money in leading Maine mill.

It's an R & M Moyno in Wisconsin, too.

Installation in a New Hampshire mill.

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MOYNO PUMP DIVISION **SPRINGFIELD, OHIO**

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888,310 tons. In 1937, production rose to 12,837,000 tons; capacity, 15,572,850 tons, and in 1941, to meet the huge demand for paper, production increased to an estimated total of 17,280,000 tons, against a capacity of 17,900,000 tons.

Late estimates indicate that the increase of all industrial production for 1941, over 1940, was 28.2%; manufacturing products, 31.9%; capital goods production, 45%; consumer goods production, 20.1%. The increase in the overall production of paper in 1941, over 1940, is estimated at 19%, thus indicating that by this substantial increase in output the United States paper industry stands at the head of the industries producing consumer goods.

Technological Improvements

Production of the many kinds of paper, paper board and paper products, has been in great part rapidly and almost continuously increased from year to year, because of technological improvements. This technical or scientific advancement may be attributed to technical workers and engineers within and outside the industry. A very substantial contribution may be accredited to the Technical Association of the Paper Industry. The research work and studies of its members made available in the articles and reports appearing in the association's publications, and in the PAPER TRADE JOURNAL, form a detailed record of technological progress within the industry.

Better Paper at Less Cost

Industrial engineering in varied forms has entered to a large extent in the production of more and better paper at less cost to the consumer. Inventions and improvements to plant equipment and machines have been made by employees within the mills. Manufacturers of paper mill equipment, machinery, and supplies, have, of course, been of inestimable service in improving the quality and quantity of paper.

High Margin of Capacity

The relatively high margin of capacity above average actual production, has been a characteristic of the paper industry for many years. The unit of plant investment per dollar of sales is one of the largest among industrial groups. Paper manufacturers have been insistent in demanding new and more efficient equipment and supplies which would aid in producing a better product and a standard product at less cost. For this reason, the paper industry has long been one of the largest quality markets for manufacturers of equipment able and willing to cooperate with the mills for their continuous improvement.

Highest Quality of Equipment

It is primarily due to this practice of paper mills to purchase the highest quality in equipment and supplies, that suppliers have found it profitable to meet this demand. As a result, manufacturers of equipment and supplies have vastly improved their equipment and machinery and power has been more efficiently distributed to drive mill machinery. And this is also applicable to all the supplies consumed by the paper industry. Manufacturers of lubricating oils, to mention but one instance, have contributed to the longer interrupted service and made higher operating speeds possible through the development of special lubricants.

Production and capacity figures in the paper industry are thus not in themselves, an exact yardstick by which the actual maximum tonnages of paper can be determined. Capacity has been increased and is being increased by the erection of new mills. But the reason why the paper industry has been able to increase its production by approximately three million tons more in 1941 than in 1940, is due to the higher operating speeds made possible by more efficient equipment and the technological advances which afford better control of all steps in the process of manufacturing paper.

Papermaking Chemical Consumption in 1941 Reaches All-Time Record

Written Especially for the Annual Review Number of the Paper Trade Journal

The heavy defense and general industrial demand for heavy chemicals and other raw materials used in the paper industry, created a very strong and active chemical market in 1941. Production was widely expanded and while some tightness occurred in a few chemicals, supply was adequate to meet the requirements of the paper industry. The exception was in the supply of chlorine. Heavy defense needs resulted in a mandatory priority control of chlorine and a strict allocation of supply later in the year. The supply available for non-defense consumption in 1942 remains uncertain. This inadequacy of supply to meet the abnormal all-over demand, is not interpreted to mean that the paper industry will be unable to obtain any chlorine in the future.

Blanc Fixe

Demand for blanc fixe continued steady with prices stable. Prices were advanced in October $5 per ton on the pulp and $10 per ton on the powder.

Bleaching Powder

Heavy defense requirements for bleaching powder for use as protection against disease and poison gas, resulted in fixing temporary maximum prices by the OPA on December 10, 1941. The temporary prices per hundred weight were as follows in carload lots: 800 lb. drums, $2.25; 333 lb. drums, $2.50 and 100 lb. drums, $3.10.

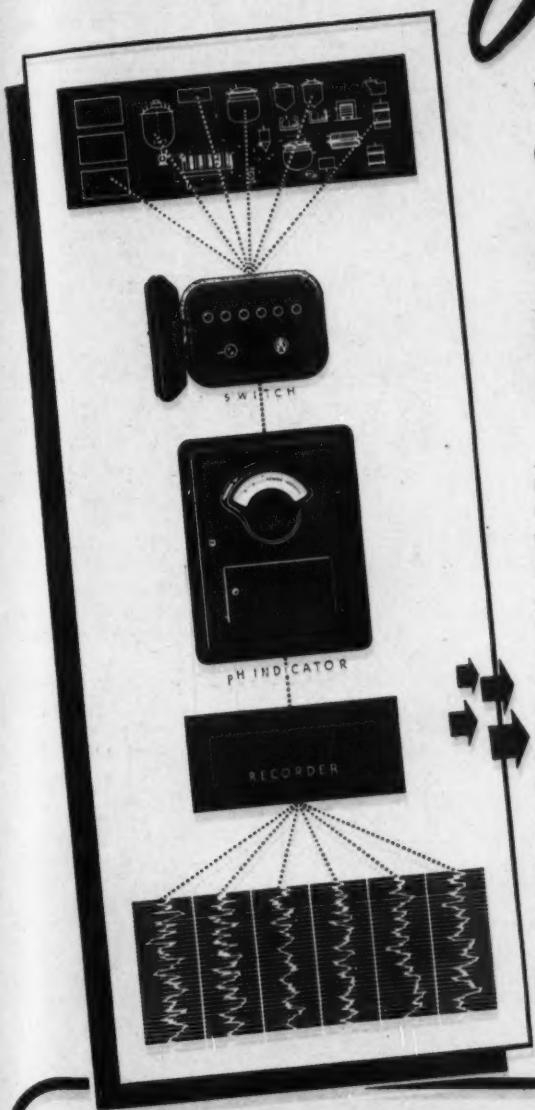
Casein

Casein production increased slightly during 1941. It was estimated the production was around 52 million pounds, as against 48 million pounds for 1940. Imports also increased considerably, and it is estimated they were above 40 million pounds.

AGAIN IT'S *Beckman*

with another important — *and exclusive* — pH development...

AUTOMATIC *MULTIPLE GLASS ELECTRODE* RECORDING!



Again another major advancement in the pH field is developed by Beckman—*and available exclusively with Beckman pH Equipment*...the *Automatic Multiple Glass Electrode Recording Switch!*

WHAT IT DOES: This switch makes possible *automatic and continuous* pH recording from as many as SIX different electrode stations, using only one Beckman pH Indicator and one multiple recording instrument. Thus, from a single indicator and recorder installation, you can maintain automatic and continuous check over the pH in as many as *six* different operations of your plant processes.

HOW IT WORKS: The switch is completely automatic in operation and there's nothing to require the operator's attention at any time. *Automatically* the switch connects the first set of electrodes into the automatic pH indicator and gives time for the recorder to print the pH reading from this set of electrodes on the chart. Then the switch automatically disconnects the first station and connects in the next electrode station for recording its pH reading ...repeating this operation on as many as six electrode stations, and then repeating the cycle over again, *continuously*, without any attention from the operator.

The Automatic Multi-Electrode Switch is another Beckman pH development of major importance to modern industrial control operations. Like the *Beckman High pH Electrode*, the *Beckman High Temperature Electrode* and other Beckman advancements, this new pH development is available in Beckman Equipment *exclusively!*

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Beckman The leading name in pH

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Prices radically advanced during the year. During late winter and early spring, the price range was around 5 cents per pound, c.i.f. on the Argentine, and 11 cents for the domestic. However, the prices advanced to levels around 27 cents per pound, c.i.f. for Argentine and 31 cents for premium domestic. During the year, the duty was cut 50%, and the new duty is 2¾ cents per pound.

It is generally believed that prices in 1942 will continue at relatively high levels, and that consumption would be heavy. Of course, it is possible that some wartime regulation may have an effect on production, and even on prices. It is expected large quantities of milk will be diverted into food products, both in the Argentine and the United States, during the coming year.

Caustic Soda

Heavy defense and export demand caused a tight situation in caustic soda in the 1st quarter of the year. Prices remained stable. New plants and the increased chlorine output added to the total supply which was adequate to meet the increased demands.

China Clay

China clay prices remained firm during the whole year and there is little likelihood of any reduction during 1942. Supplies remained ample and imports were at a fair level, compared with previous years.

Chlorine

Government requirements resulted in an acute shortage of chlorine in 1941. The OPM early in the year restricted the industrial use of chlorine. In July chlorine was placed under full priority of control. At the end of the year the normal requirements of the pulp industry has been reduced 50%. On December 22, 1941, the OPM amended its General Preference Order No. M-19, placing all domestic produced chlorine subject to direct allocation for specific uses by individual consumers effective February 1, 1942. The Limitations Order L-11 is still effective, restricting the use of chlorine in the paper and pulp industry. Output was increased to approximately 700,000 tons for the year. Prices were stable and unchanged on single-unit tank car lots.

Rosin

Rosin and therefore, rosin size, had a material advance during the past year. Consumption of rosin in all industries, including paper, were at a very high level. Exports were also heavy, and therefore, stocks were reduced. The price range for the G Grade was between $1.62 and $3. The higher level occurring towards the end of the year. It is generally believed that production of rosin in 1942 will be lower than in 1941, due to the scarcity of labor and other factors. All indications are that rosin will sell at a much better average price in 1942 than in the past several years, although there may be some reaction from present levels during the heavy producing season in the summer months.

Salt Cake

Production of both the natural and synthetic cake, was at a high level during 1941, and it is expected will continue through 1942. Prices remain firm, with an upward tendency, and this condition is expected to remain the same through 1942.

Soda Ash

All alkalies were in heavy demand in 1941 and while large consumers of soda ash required from 10% to 15% more than in the previous year, supply was adequate. Prices remained stable, with a small upward revision to cover increased cost of burlap bags only.

Starch

Corn starch was in active demand and lack of other and imported sizing materials increased the demand for corn starch. Prices were stable, the price increase for the year being 15 cents per cwt. on pearl and the powdered grade.

Sulphate of Alumina

Demand for sulphate of alumina during 1941 was exceptionally good. Consumption was probably higher than any year on record. While production was sufficient to take care of current needs, demand was closer to rated production than at any time in the past twenty years. There were very few price changes during the year. As the paper industry is expected to continue at high levels, it is presumed that very little change will occur both in supply and demand in the immediate future. The demand for sulphuric acid is expected to continue very heavy, and probably increase during the current year.

Sulphur

Sulphur prices were stabilized the first of the year by leading producers who promised to protect consumers against rising prices. Supplies were adequate to supply the 750,000 additional tons required for the year. Total domestic shipments for 1941 approximated 3,325,000 tons.

Talc

Demand for domestic talc was active in the lack of supplies from France and Italy. Prices were stable.

Newsprint Shows Increase

Production of newsprint in Canada during January 1942 amounted to 311,904 tons and shipments to 291,998 tons, according to the News Print Service Bureau. Production in the United States was 84,628 tons and shipments 80,787 tons, making a total United States and Canadian newsprint production of 396,532 tons and shipments of 372,785 tons. During January, 28,622 tons of newsprint were made in Newfoundland, so that the North American production for the month amounted to 425,154 tons. Total production in January 1941 was 382,695 tons.

The Canadian mills produced 50,606 tons more in January 1942 than in January 1941, which was an increase of nineteen and four tenths per cent. The output in the United States was 4,496 tons or five per cent less than in January 1941, in Newfoundland production was 3,651 tons or eleven and three tenths per cent less, making a net increase of 42,459 tons, or eleven and one tenth per cent more than in January 1941.

Stocks of newsprint paper at the end of January were 143,477 tons at Canadian mills and 11,427 tons at United States mills, making a combined total of 154,904 tons compared with 131,157 tons on December 31, 1941, and 188,713 tons at the end of January 1941. During the winter some tonnage is accumulating at points from which water shipments will later be made.

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Canadian Pulp and Paper Industry Stages A Remarkable Recovery in 1941

By C. L. Sibley, Regular Correspondent of the PAPER TRADE JOURNAL

Under the stresses and strains of war, the pulp and paper industry of Canada has staged a remarkable recovery, partly due to the skill and high standards of its executives and operating staffs, for which it has always been distinguished (as opposed to the operations of speculative promoters who indulged in an orgy of over-expansion some years ago), and partly due to the fact that Scandinavian exports have been almost entirely cut off from overseas markets. The result is that this industry, demand for whose output some of the wisest observers said only a few years ago would not overtake its capacity for 30 years, is going full blast in every department, not only meeting all the requirements of the free nations whose supplies from elsewhere have been cut off, but functioning as a major war industry of vital importance to the cause of victory. Thus the overexpansion that in times of peace was a curse has proved a blessing in time of war, for war has found Canada equipped and ready in this one key industry not duplicated on anything like the same scale in any other country.

The fact that Canada is the chief source of supply of newsprint for the democratic press of the world, with 35,000,000 Americans alone daily buying newspapers printed on Canadian paper, is only one phase of the industry's importance in this war. Here is how other phases of its achievements are officially described: It has supplied pulps for the manufacture of explosives; containers for munitions and food; wallboard for temporary shelters for bombed-out areas in Britain, for housing the armed forces in Britain, Africa and Canada and for building war plants. Its products go into every shell that leaves a gun, into land and naval mines, gaskets for the motors of mechanized equipment, into the manufacture of airplanes and into radio and radio-locator equipment. Its machine shops at the mills have blazed the trail to wider sub-contracting and are turning out parts for prime manufacturers, the lack of which tends to form bottlenecks in Canada's munition-producing industries. And not its least important achievement is that by the export of its products it has provided Canada in the past year alone with a quarter of a billion dollars of foreign exchange wherewith to purchase war requirements from the United States.

Newsprint Has Good Year

In the matter of meeting the demands made upon it the newsprint industry has kept abreast of requirements despite all sorts of difficulties in every direction, and has maintained stability of supply and price in a manner beyond praise. As a result two official heads of the industry (F. G. Robinson, president of the Canadian Pulp and Paper Association, and Paul Kellogg, deputy-president of the Newsprint Association of Canada) have signed their names to this joint statement:

"Probably no one period in its entire industrial history has brought so many indications of appreciation and goodwill from so many sources as the closing months of the past year: that statement applies to virtually every section of the trade, and to every free market in the world.

"To round out the 1941 record, and to associate it with the efforts of recent years, the following might be cited as the factors contributing to this rather widespread atmosphere of goodwill;

"1. Continued price stability in the Canadian and United States markets over a period during which, for most Canadian newsprint producers, a substantial advance might have seemed implicit in both operating and general economic conditions;

"2. The unanimous determination to regard newsprint as the basic Canadian mill product and the industry's major concern; and, arising from that decision, the regular supply of all free world markets, regardless of almost unprecedented shipping, foreign exchange and Government control problems;

"3. The general policy of adjusting the industry's excess capacity to the needs of national defense; coordinating its machine capacity, directly and indirectly, with the wartime industries of Canada, Great Britain and the United States."

Production Second Highest on Record

The total production of newsprint in 1941 was 3,425,865 tons, the highest production on record except in the year 1937, when it amounted to 3,647,800 tons (1937 was the year when publishers were accumulating abnormal stocks). The tonnage produced was higher than in 1940 by 7,062 tons. Shipments for the year were slightly higher than production, namely 3,454,665 tons, as compared with 3,435,934 tons in the previous year. The actual annual capacity of Canadian mills in 1941 was 4,340,735 tons, as compared with 4,367,690 tons in 1940. Production, therefore, was at the rate of 78.9% of capacity, as compared with 78.3% in the previous year.

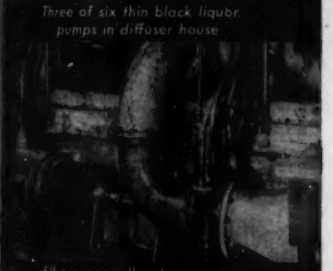
Overseas shipments of newsprint fell from 657,588 tons in 1940 to 487,897 tons in 1941, but the difference (169,691 tons) was more than made up by increased shipments (175,550 more tons) to the United States. There were also increased shipments to Canadian publishers, the total being 196,766 tons, as compared with 183,894 tons in 1940.

The decline in overseas shipments was primarily due to enforced reductions in the size of overseas papers and to public policies restricting imports for the conservation of exchange and shipping space. It was in the United Kingdom and Australasian markets that these factors mainly applied, other Empire markets maintaining supplies quite close to normal. As regards Latin American markets and the Far East, the main handicaps were a shortage of ocean transport and difficulties in obtaining U. S. funds. To the last month of the year carefully regulated shipments to China, British Malaya and the Netherlands East Indies kept business at around the levels of normal

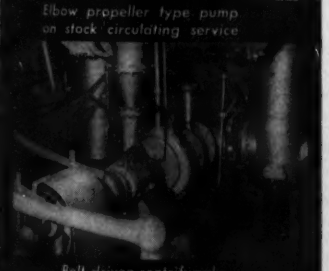
PUMPING EQUIPMENT THAT KEEPS THE PAPER COMING

Centrifugal paper stock pump in a prominent midwestern plant

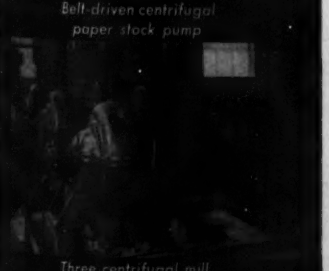
Three of six thin black liquor pumps in diffuser house



Elbow propeller type pump on stock circulating service



Belt-driven centrifugal paper stock pump



Three centrifugal mill water supply pumps

PRODUCTION without interruption . . . that's the objective today, and Worthington pumps are helping materially in this achievement. The ability of this equipment to stay on the job under adverse conditions is now seen as an operation factor of major importance.

And, in the substitution of materials for those no longer available, Worthington's knowledge of pump metallurgy in relation to paper mill requirements, becomes increasingly valuable in avoiding costly misapplications.

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On any expansion or change-over plans, it is good business to invite a Worthington recommendation. CP2-1

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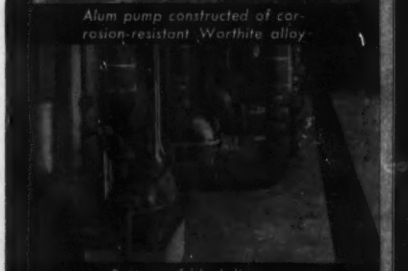
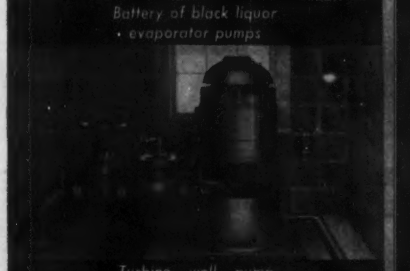
Two centrifugal pumps transferring green liquor from dissolving tank to storage



Alum pump constructed of corrosion-resistant Worthite alloy



Battery of black liquor evaporator pumps

Turbine well pump for main water supply

WORTHINGTON

years, but now, of course, the situation has completely changed, and the bulk of the Oriental trade is cut off, for the time being at least.

As the Government does not now publish detailed monthly reports of exports, exact figures as to the value of Canada's exports of newsprint in 1941 are not available. In 1940 they had a value of $151,602,446, and as there was no price change, the value for 1941 (allowing for the somewhat larger tonnage) may be placed in the neighborhood of around $152,000,000.

Outlook for Present Year

Regarding the outlook for the present year, this is how it is officially put on behalf of the Canadian Pulp and Paper Association:

"For 1942, the financial perspective is one of indeterminate factors, and added burdens with no compensations yet in view. Effective through the second quarter of 1942, an advance of $3.00 per ton in the basic export price of Canadian newsprint was announced to the trade by most manufacturers, the first notice being dated December 8 last. This will bring the New York delivered price to $53.00 U. S. funds, but it by no means adds up to the costs and production difficulties introduced by the war. It was the first price advance to United States customers in four and one quarter years. It will boost by close to $10,000,000 the value of newsprint to Canada as a major producer of foreign exchange.

"The 1942 physical volume outlook is also one of indeterminate factors, and any forecast must assume that some at least of the unreliable ones abroad will be offset by certain others in the Canadian and United States markets. With all the odds in mind, therefore, it may be reasonably accurate to anticipate that the 1942 newsprint demand in Canada's major markets will hold fairly close to 1941 levels, which should give the industry an operating ratio between 75 and 80%.

"Among other 1941 trends was the start of an effort to discourage the consumption of colored newsprints, and several publishers have already abandoned their color schedules, or have indicated their intention to do so. This is a step towards the conservation of basic chemicals needed for more essential uses. Recently steps have been taken toward the simplification and standardization of the types of products manufactured."

Shipment of Newsprint

The shipments of newsprint from Canadian mills in 1941 amounted to 3,454,655 tons, as compared with 3,435,934 in 1940 and 3,654,669 in the peak year of 1937. The following tables, supplied by the Newsprint Association of Canada, give comparative figures as to shipments (in tons) and destination of newsprint from Canadian mills during the past five years:

TO CANADA

	1941	1940	1939	1938	1937
Jan.	14,591	13,541	14,865	9,926	15,331
Feb.	14,207	15,223	13,582	9,453	14,965
March	16,225	15,418	15,992	12,286	20,384
April	16,957	15,793	16,371	13,306	16,542
May	17,011	12,383	15,434	15,007	18,637
June	16,145	16,496	16,155	15,164	15,659
July	16,024	15,809	15,296	12,912	17,759
Aug.	15,584	15,977	14,413	12,865	14,651
Sept.	16,364	15,255	16,443	12,973	17,629
Oct.	18,792	16,442	18,702	14,153	18,996
Nov.	19,508	15,855	15,657	15,957	21,377
Dec.	15,358	15,702	16,572	15,195	27,623
Year	196,766	183,894	189,482	159,197	219,553

TO UNITED STATES

	1941	1940	1939	1938	1937
Jan.	192,144	190,096	160,657	124,439	196,513
Feb.	185,618	164,296	140,186	115,385	189,876
March	212,727	186,788	155,642	133,933	232,240
April	226,830	196,956	177,328	157,824	253,666
May	241,437	248,229	201,503	149,642	232,128
June	231,553	253,390	173,760	141,055	236,888
July	233,159	249,252	158,770	145,318	235,138
Aug.	230,284	232,251	168,645	162,149	245,050
Sept.	238,949	218,989	213,219	171,756	240,820
Oct.	247,231	213,705	220,595	198,889	279,319
Nov.	261,611	219,254	220,469	203,646	273,985
Dec.	268,429	220,996	203,432	176,984	293,737
Year	2,770,002	2,594,452	2,194,126	1,881,020	2,909,360

TO OVERSEAS

	1941	1940	1939	1938	1937
Jan.	36,659	40,636	26,330	34,595	41,971
Feb.	39,920	31,903	24,548	38,068	28,387
March	36,772	33,098	33,465	36,468	37,088
April	42,002	54,385	20,556	43,052	38,242
May	32,664	73,829	57,698	28,639	53,499
June	34,115	68,560	42,346	52,257	51,085
July	51,053	72,447	47,677	47,260	40,774
Aug.	51,117	84,026	41,309	29,654	66,521
Sept.	49,697	49,889	37,343	45,617	42,366
Oct.	38,662	57,796	49,963	42,058	39,900
Nov.	39,741	51,360	51,743	44,818	61,878
Dec.	35,495	39,759	44,616	33,293	24,045
Year	487,897	657,588	477,594	475,779	525,756

Production Ratios of Newsprint Mills

The production of Canadian newsprint mills in percentage of capacity in 1941 averaged 78.9%, as compared with 78.3% in 1940, and 93.9% in the peak year of 1937. The following table gives the monthly ratios for the past five years:

ANNUAL CAPACITY

Tons, 1941	Tons, 1940	Tons, 1939	Tons, 1938	Tons, 1937
4,340,735	4,367,690	4,293,361	4,204,200	3,883,000

Monthly Production, Percentage of Capacity

	1941	1940	1939	1938	1937
Jan.	71.5	68.5	59.8	65.4	92.2
Feb.	72.9	65.8	60.0	62.0	91.7
March	75.5	68.5	58.6	61.0	89.1
April	76.7	73.4	63.4	56.8	90.8
May	75.1	85.1	66.4	58.7	95.1
June	77.9	89.1	66.4	57.0	95.5
July	80.4	90.8	65.3	59.6	96.8
Aug.	80.2	83.2	63.0	60.0	97.9
Sept.	84.9	83.5	72.7	68.2	99.4
Oct.	84.1	81.5	77.5	72.0	96.6
Nov.	85.5	77.1	79.7	69.3	92.7
Dec.	82.4	71.8	69.1	59.3	98.8
Year	78.9	78.3	66.8	62.4	93.9

Large Increase in Pulp Exports

Prior to the war Canada's exports of pulp were on nothing like the scale of the Scandinavian countries, but as exports from the latter fell off and finally virtually ceased demands upon Canadian producers increased, especially for chemical pulp. As a consequence exports from Canada jumped from 706,000 tons in 1939 to 1,069,000 tons in 1940. and for 1941 they are estimated at around 1,120,000 tons, of a value of about $84,000,000, final figures not yet being available. The principal customers were the United States and the United Kingdom, exports to the latter increasing over 60 per cent. This increase in exports by no means represents the full increase in production, for in Canada, as in Britain, there have been large demands for pulp for making explosives, as well as larger demands for conversion into the constantly increasing manufacture of various kinds of paper formerly imported, as well as for such products as paper board and wallboard.

Book and Writing Paper

The vast expansion of Government business consequent on the war, the setting up of huge military establishments and of really colossal establishments for the manufacture of every type of war weapon,

PULP

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PAPER

have created an unprecedented demand for book and writing papers, this being added to by publicity campaigns for the sale of War Savings Certificates, War Loans, and so on. A further complication was that exchange rates cut imports from the United States, while supplies from Europe virtually ceased. It must be said that the manufacturers have met the situation admirably, all things considered. While difficulties of supply have developed and continue, and while Government orders are in the nature of "commands," customers have been kept pretty well supplied, and nothing in the nature of a paper famine has developed. The need of conserving paper has been impressed on customers, and paper-saving campaigns have been vigorous. In addition, paper salvage campaigns have turned a lot of used paper back for reprocessing. Government restrictions on the use of chlorine have resulted in lower color grades in many lines. Figures as to production for 1941 are not yet available, but are estimated at around 7% above that of last year.

Paper Board, Wallboard and Wrapping Paper

Large and increasing demands for paper board for packing munitions and food have made the past year a busy one for paper board manufacturers, but demands have been effectively met, thanks to simplification of grades, colors and sizes. Production in 1941 is estimated at some 468,000 tons, as compared with 417,000 tons in 1940.

For wallboard the demand has jumped, due to construction for military camps and war industries in Canada and to demand from the United Kingdom for wallboard for building shelters and rebuilding bombed areas. In addition there were demands for large shipments to the United States to relieve shortages there. Working in close co-operation with the Government, the manufacturers have done an outstanding job in making deliveries. Total production in 1941 is estimated at around 97,000 tons, as against 83,356 tons in 1940.

The same conditions of added demand for war purposes have applied to wrapping paper, output of which in 1941 increased by an estimated 23.5% over the 139,716 tons produced in 1940.

The Industry's "Bits and Pieces" Program

Acting through its central organization, the Canadian Pulp and Paper Association, the pulp and paper operators of Canada originated and developed the "bits and pieces" program which now is giving a vital "push" to the production of war supplies in Canada. The program, which is being carried out without profit, has two phases—1, the supply and training of skilled technicians for use in war plants where needed; 2, the production in the machine shops of the industry of those articles which tend to form bottlenecks in Canada's munition-producing industries, such as parts of corvettes, minesweepers, cargo vessels, ordnance, airplanes and special services.

As pulp and paper mills are usually remote from larger centers, they have had to establish more or less elaborate machine shops for maintenance work, together with staffs of executives, engineers, machinists, draftsmen, electricians, steamfitters, chemists, laboratory assistants, and skilled operators. The idea was conceived that this specialized equipment and the specialized skills of the staffs might in part be made available to the nation for war work. There-upon what is called the Wartime Machine Shop Pulp and Paper Products Administration Board has been established by the Canadian Pulp and Paper Association to train men so as to enlarge the supply of skilled workers; to "upgrade" existing staffs in order to make men available for war industries; and to undertake to manufacture in the industry's own shops, "parts" for munitions, the last-named to be accomplished by putting the shops on a 24-hour day schedule, so as not to interfere with mill maintenance.

Every phase of the scheme is working admirably. Training of men, both in the shops and through night schools and correspondence courses, has become a most helpful feature of industrial education in Canada; many executives, technicians and skilled operators are on "loan" to the Government; and an impressive total of sub-contracts for "bits and pieces" has been placed with the mills by the co-ordinators.

A sample of the posters displayed in the machine shops of the mills reads as follows: "For Freedom—Every Man, Every Tool. Always our flag has stood for freedom of thought, speech, justice, religion and association—our Freedom. To win this War for Freedom, sailors, soldiers and airmen must have the tools to fight—more tools—better tools than our enemies — ships, tanks, planes, guns. Maintenance men — maintenance tools of the pulp and paper industry of Canada — speed the flow of tools to our comrades at arms by making parts of machines of war. Men—we have a job to do; let's do it. Work carefully, work accurately, work swiftly. The Wartime Machine Shop Board of the Canadian Pulp and Paper Association co-ordinates this contribution to Canada's national war effort without cost."

It may be added that to pay the salaries, office and other expenses of the co-ordinator and his staff, a flat percentage on all contracts placed through the Wartime Machine Shop Board is paid by the subcontractors. When the war is over the books of the Board will be audited by the Government and any surplus will be returned to the subcontractors on a pro rata basis. Meanwhile uniform systems of accounting and records are in operation.

Wholesale Government Price Control

A complicating factor in the pulp and paper industry, as in every other industry in Canada, has been the wholesale adoption of Government price control, with a ceiling placed on the price of all commodities sold in the domestic market and all services. This far-reaching innovation, designed to prevent inflation, has already had the effect of arresting the rise in the cost of living and indeed of bringing about some slight reduction. How it will work out in industry has yet to be determined, but able administrators have been recruited from business to see to the carrying out of the complicated regulations and to make such adjustments as may be considered wise and fair. The people as a whole are loyally behind the experiment, and high hopes are held that it will be successful in achieving the end desired, though it will prove costly to the Government by various forms of subsidy, provision for which has been made under advisement. This cost, it is felt, will be more than compensated for by the economies effected. It will mean in every business a sharp scrutiny of all costs, as well as standardization and simplification of all lines of production. In order to cope with the problems as applied to the pulp and paper industry, a been established as a separate unit of the Wartime Prices and Trade Board, with offices in Montreal.

This is in charge of W. H. Howard, K.C., a well-known legal authority as co-ordinator, and associated with him is a board of pulp and paper experts. The chief problems with which the Bureau has to concern itself is maintenance of prices in the face of rising costs and supply difficulties in regard to raw materials, chemicals, etc., used in the industry.

Paper and Pulp in Canada's Economy

For a quarter of a century the pulp and paper industry has been in the front rank of the industries of Canada, and for years it has held unchallenged the distinction among the normal industries of the country of ranking first with respect to wage and salary distribution, capital investment and net value of production. The latest detailed report of its operation, issued by the Government, covers the year 1940. It shows that the gross value of the products in that year was $298,034,843, this representing the sum of the values of pulp made for sale in Canada, pulp made for export, and paper manufactured. It does not include pulpwood nor the pulp made in combined pulp and paper mills for their own use in making paper. The net value of products was $158,230,575, this figure being arrived at by subtracting the cost of materials and supplies, fuel and electricity from the gross value of the products. The pulp made in combined pulp and paper mills for their own use in paper-making is considered as a stage of manufacture and is not included as a product of the pulp mill nor as a raw material of the paper mill.

The cost of materials and supplies used in the mills was $108,758,862. The number of persons employed was 34,719 and the total wages and salaries paid was $56,073,812. The cost of fuel used was $13,700,105. The cost of purchased electricity was $17,345,301, the total power employed reaching a new high of 1,986,667 h.p. The capital employed was $642,979,942, only the capital invested in operating mills being included in this total.

It should be explained that all the figures given above apply only to the manufacturing stages of the industry, no allowance being made for the capital invested, the men employed, the wages paid, nor the products of the operations in the woods which form an important part of the industry as a whole.

One hundred and three mills operated in 1940. Of these 76 manufacturing pulp produced 5,290,762 tons, valued at $149,005,267. Of this 3,962,129 tons, valued at $77,682,566, was produced by combined pulp and paper mills for their own consumption in paper making. The 76 mills making paper in 1940 produced 4,319,414 tons of paper and other products, valued at $225,836,809. Newsprint made up 81.1% of the total reported tonnage of paper manufactured in that year.

The apparent total production of pulpwood in 1940 was 8,499,922 rough cords, valued at $74,347,132.

Wood pulp exports in 1940 amounted to 1,068,516 tons, with a value of $60,930,149. The total exports of paper and paper goods in 1940 were valued at $170,879,526.

The industry in 1940 was the chief contributor in sustaining Canada's balance of trade, this contribution amounting to $234,254,085, being the sum of the differences between exports and imports of pulpwood, wood pulp and paper.

The following tables give the production and value of the products of newsprint and paper mills over a term of years:

Year	Quantity: Newsprint, Tons	Quantity: Other paper, Tons
1928	2,414,393	434,806
1929	2,725,331	471,818
1930	2,497,952	428,835
1931	2,227,052	384,173
1932	1,919,205	371,562
1933	2,021,965	397,455
1934	2,604,973	464,543
1935	2,765,444	515,352
1936	3,225,386	581,943
1937	3,673,886	674,475
1938	2,668,913	590,445
1939	2,926,597	673,905
1940	3,418,803	815,613
1941	3,425,865	.....

Year	Value: Newsprint	Value: Other paper
1928	$144,146,632	$40,158,773
1929	150,800,157	42,189,095
1930	136,181,883	37,123,991
1931	114,419,637	32,210,252
1932	85,539,852	28,333,271
1933	66,959,501	29,730,374
1934	86,811,460	34,080,765
1935	91,762,201	37,316,185
1936	105,214,533	41,217,401
1937	126,424,303	49,461,120
1938	107,051,202	44,598,863
1939	120,858,583	49,928,479
1940	158,447,311	67,389,498
1941 (Estimated)	160,000,000	70,000,000

Note.—In the above tabulation "other paper" includes book and writing paper, wrapping paper, paper boards, and other paper products.

Lumber Requirements Filled

As many of the large pulp and paper corporations are also manufacturers of lumber, a few particulars of that department of the forest industries will help to round out the general picture. In June, 1940, a Timber Control Office was established to cover all phases of the production and distribution of lumber and allied products. The reason for this was that Canada had suddenly become the sole source of supply of softwood lumber remaining open to the United Kingdom, while at the same time Canada's greatly accelerated war effort was causing an unprecedented demand for lumber and other forest products for domestic defense purposes and for the expansion of war industries. Transcontinental rail haul of lumber at one period was on such a scale that it reached the record of 80 million board feet in one month. Lately it has slackened off, partly because Britain has been able to get supplies from Archangel, but in the first 10 months of last year Canada's exports of planks, boards and square timber reached 1,973 million board feet, valued at $62,798,092.

In addition the demand for lumber for Canada's own war effort was about 400 million board feet last year. Lumber was delivered at 150 different sites in Canada for use in the construction of more than 4,000 wooden buildings at naval, military and air establishments and at munitions factories. Extension of training facilities required the supply of timber frames for 149 aircraft hangars and and drill halls, in addition to 325 units supplied in 1940. More than 10 million board feet of hardwood flooring, 6 million square feet of plywood, and millwork valued at more than $1,000,000, were consumed in the building program. Many million feet of lumber were used in ammunition and other boxes, and the value of shooks and barrels produced exceeded $2,500,000. A rigid system of price control was inaugurated, and so effective was this that the general lumber price index in Canada in 1940 increased only from 105.8 in July to a peak for the year of 109.2 in November. Later the influence of operating costs and higher prices ob-

tainable in the United States caused prices to rise, but they are still under rigid control, with fair allowance being made for increased operating costs.

Hydro-Electric Power Development

In view of the fact that the pulp and paper industry consumes almost one-half of the electrical power produced in Canada for industrial purposes and is itself the owner and operator of many of the large hydro-electric developments, no review of the industry would be complete without reference to this phase of its interests. The ever-increasing demands of war industry for power have been met by the bringing into production of new water power installations, by the construction of new transmission line facilities, by the diversion to primary use of large amounts of hydro-electric energy that had formerly been sold as secondary power for steam raising in electric boilers, and by the continuation of daylight saving during the winter months.

New water power installations during 1941 totaled 254,600 h.p. This brings Canada's total hydraulic installations as of January 1, 1942, to 8,845,038 h.p. There are other undertakings under way which should add more than 650,000 h.p. to this total during the next year and a half. Of the new installations no less than 230,000 h.p. was in the province of Quebec, most of it in the valley of the St. Maurice river, Quebec, the power from which is used for the production of nearly one-fifth of all the pulp and paper produced in Canada.

Of the work under construction the most interesting is the Ogoki River diversion project in Ontario. This will have the effect of diverting into the St. Lawrence system a large body of water now discharging into Hudson's Bay, and thus of raising the level of the Great Lakes, and of increasing the flow at Niagara Falls and at other points on the St. Lawrence where power is developed. The regulating dam at the summit between the areas drained by the Ogoki and Nipigon rivers is now completed, and the main dam on the Ogoki river, together with the necessary channel improvements, has progressed so that it is expected that diversion of the Ogoki waters will be commenced in 1943.

Scientific Research

Scientific research as applied to the pulp and paper and other forest industries has continued unabated during the past year, but has been more particularly applied to the new and urgent problems arising out of the war. Indeed, of scientific research as a whole it may be said that the National Research Council at Ottawa, the universities, members of the scientific and engineering professions and the technical staffs of industrial firms are pulling together towards the common goal, united as never before in the single purpose of winning the war. In respect to the forest industries a brief summary may be given of the progress of work by the National Research Council. There is the question of the successful utilization of waste sulphite liquor. This depends largely on the possibility of converting the lignin fraction, which constitutes 60% of the solids, to products of commercial value. It has been found that waste sulphite liquor could be made into a suitable medium for the growth of certain wood-rotting fungi and that under favorable growth conditions approximately 10% to 18% of the lignin was decomposed. Further study is expected to give results of practical value.

Late in 1940 the Council was requested to undertake the manufacture of special charcoals for use in fuse powder. These types have a lower carbon content than ordinary wood charcoal and are rigidly restricted as to ash content and variations in carbon content. Stands of special wood were located and production of satisfactory charcoal was started in May on a 24-hour production schedule. Production has now been taken over by one of the government financed munitions plants with a view to larger development.

Much survey and experimental work has been done in regard to plastics for military purposes and in regard to the use of laminated wood in aircraft construction.

Problems of reforestation have continued to occupy attention. Canadian scientists were among the first in the world to recognize the possibilities in the field of forest tree breeding. The breeding work has now been expanded to include all the more important eastern trees, namely, spruce, pine, larch, poplar, birch, basswood, elm, maple, oak and ash. Quickest results have been obtained in poplar. About 30 hybrids have been produced, some of which show definite superiority over natural species. Several hybrids have been obtained in pine, including crosses between white pine and Macedonian pine (reputed to be resistant to blister rust), Scotch pine and Australian pine, and jack pine and lodgepole pine. Work on spruce has yielded one promising hybrid, a very vigorous form involving black and Norway spruces. Larch was cross-pollinated for the first time this year.

Experimental studies on the use of cuttings for the propagation of native forest trees selected for disease resistance, growth hardiness and other desirable qualities have been carried on in co-operation with the Dominion Forest Service. Upwards of 60% of white pine and 90% of white spruce cuttings may be rooted in outdoor frames if the cuttings are made at the proper season and are placed in suitable sand-sedge peat mudium. The success with white pine renders it immediately practicable to propagate cuttings of individuals found resistant to white pine blister rust or weevil infestation. Work has been extended to the study of cuttings of black spruce, red spruce, Colorado spruce, Douglas fir, balsam fir, red pine, Scotch pine, jack pine, lodgepole pine and larch, and with cuttings of a number of important hardwood species.

In addition to this work of the National Research Council much other work of a scientific and technical nature has been done by the Technical and Woodlands Sections of the Canadian Pulp and Paper Association, and by the Forest Products Laboratories which the association helps support. A record of this work is not at the moment available.

Brown Co. Claims Heard

PORTLAND, Me., February 16, 1942—Federal Judge John A. Peters took under consideration Saturday of last week, after a four-day hearing, claims totaling $1,171,979 for fees and expenses of counsel participating in the reorganization of the Brown Company, $40,000,000 paper and pulp concern. Before announcing his decision, Judge Peters will await recommendations by the Securities and Exchange Commission, which are expected in about six weeks.

DOWICIDE

Log on right: DOWICIDE treated—NO STAIN.

Log on left: Untreated—shows stain and decay.

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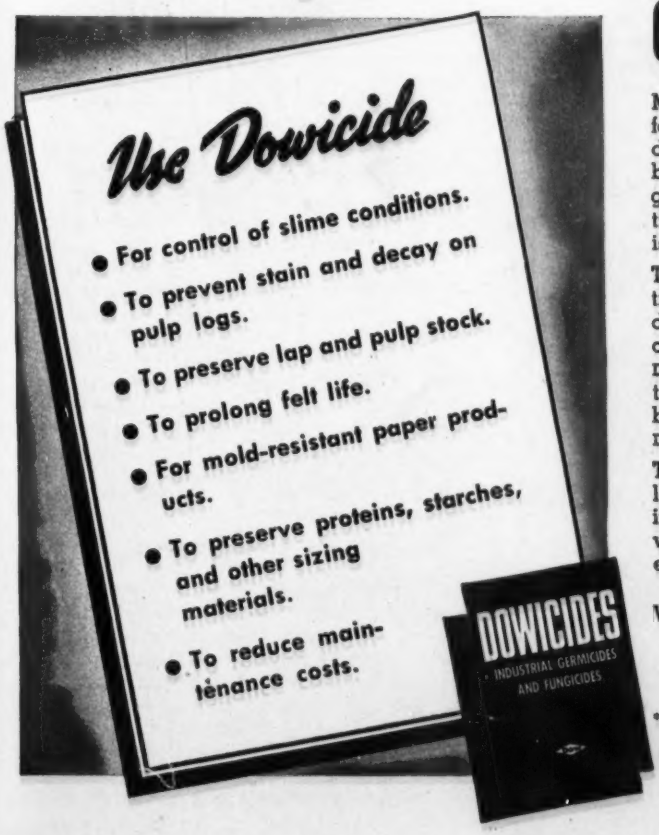
Use Dowicide
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MILLS CARRYING a considerable supply of pulp logs face the constant threat of losses from stain and decay. Practically all wood is susceptible to attack by organisms which feed on sap and cause a progressive discoloration known as sap stain. Additional losses, due to the action of "dry rot" organisms, often occur while logs are in storage.

The pulp and paper industry has found physical treatment generally unsatisfactory to prevent damage, but the development of a group of chlorinated phenols sold under the trade-mark DOWICIDE* now provides a simple, effective control for both stain and decay in pulp logs. A number of southern mills report excellent results from DOWICIDE treatments.

These products act to prevent stain and reduce loss of cellulosic material. Logs should be dipped in a 1% solution of DOWICIDE G or F—preferably within 24 hours of cutting—since stain cannot be eliminated after it has started.

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Papermaking Materials Experience a Year Of Unprecedented Problems

By Walter R. Hicks, of Daniel M. Hicks, Inc.

A year of which there is no equal in the annals of the World, or in the history of the United States, was of course, one without precedent for American Industry and quite definitely for the paper manufacturing branch. Without pretending to know too much about the overall picture of papermaking conditions and the difficulties which this first and only real World War has brought to bear, we do not hesitate to state that the raw-material situation was and is far and away the most critical and aggravating problem ever to beset the paper maker. No mill has escaped the pinch or as is the case with some, the throttle. The self-contained mill, if not in need of fibrous raw materials, has at least the problem of insufficient bleach, digesting chemicals, dyes or fillers. However the paper makers' raw material problems are actually relatively insignificant, due to a combination of elements the more important of which are common to no other industry of the size and importance of paper manufacturing.

Chief Elements in Saturation

Chief among these elements is the fact that the two basic raw materials are found in abundance and except in the case of one type of wood pulp, are not encroached upon by the needs of any other type of manufacturing. The paper maker in considering this singular and providential fact cannot but realize his tremendous advantage over his contemporaries in every other type of industry and must certainly be determined that this advantage be employed to the full extent of its tremendous possibilities. Wood and waste materials, the chief basic requirements of every paper maker—with an abundance of both! True, the converting facilities for making pulp from the great supplies of wood, are not sufficient for today's needs by yesterday's standards, but adjustments in standards, modifications of specifications and the ingenuity of the paper maker have largely compensated for the needs which the resultant production from the completed utilization of every single pound of pulp-making capacity, Canadian and American, has not been able fully to meet. Pulp will continue to be a concern in the sense that every effort will be continually necessary for all mills to get along. The pulp situation is fully reviewed in another article in this issue. We wished to treat of it briefly, only to support our statements above, that, as critical as the paper makers' problems of supply seem to be and are, they are far from being as serious as those of other industries and are potentially solvable.

Government Control

Waste materials, the other category of basic supplies, although the hectic period of adjustment made necessary by the establishment of Government control, first over waste paper, in October, and subsequently over old rags, and recently over rope, might belie it, are certainly in a relatively beautiful situation. Beautiful when compared to the situations of other industries. For what manufacturer sees an important raw material increase in virtual availability in direct proportion to his consumption of it, and the use of the manufactured product by the public, to the extent of the paper maker? The supply is automatically created by the consumer, and increases with his needs.

It may seem naive to regard the situation as simply as this. It is of course a theoretical analysis and if the actual situation is not as simple, it is not due to any weakness in the theoretical conclusion, but in the practical approach and the failure of the factors concerned to reach the theoretically indicated goal which is certainly attainable with the full cooperation of these factors, the public, the waste collector, the waste dealer, the waste consumer, and the Governmental Control body concerned.

Human Factor at Fault

As is generally the case when the practical falls substantially short of the theoretical, the human element is to blame. Each factor contributes to the situation as it exists, by its own failure to operate to the full and ideal extent of its potentiality. We speak of each "factor" as a whole, for a chain is as strong as its weakest link, just as a golf score for 18 holes is as good as the aggregate scores for each hole, with two or three "7's" or "8's" spoiling the pars and birdies of the rest of the card.

The public wastes waste materials. Efforts have been made to save them at the source. They must increase and continue uninterrupted and full blast. The 100% prevention of such waste is impossible, but every step in this direction is vital. The Government and the mills have recognized this fact. It is to be hoped that they continue and augment steps already taken.

The waste collector for his own well-being can be expected to operate effectively, limited only by such price limitations as make his operation economically impossible. Since there is no intrinsic value to waste, the cooperation of collectors could maintain fair values for this waste. In this the collector depends on the waste dealer, and the dealer in turn on the paper maker. There is an inverse dependency of the paper maker on the waste dealer which had not been recognized until the crisis had arrived. There are those among the waste dealers who feel that the previous disregard of the dependent consumers for his welfare and the welfare of the waste industry was such that voluntary cooperation with the consumer was a hollow, motiveless expectation. Fortunately the bulk of the waste material industry realizes that existence under such conditions in normal times is an integral part of being a waste material dealer, and that when the shoe is on the other foot due to a National emergency, it is not the time for punitive activity. We trust also that the bulk of the waste material industry realizes that its difficulties in normal times are as much due to the operations of its own short-sighted

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weak sisters, as they are to the depredations of some Paper Manufacturers.

A Sound Solution

At any rate Government control is in effect and basically this is a sound solution to the inherent dangers of runaway prices, hoarding, strangulation of the weaker, but important members of an industry and artificial shortages, where none should exist. When the National economy is at stake none denies the necessity of control over prices and all such steps as have been taken to assure supplies of vital raw materials at the right prices.

The application to waste paper is basically sound and definitely workable, with intelligent, unbiased and fair institution and administration by the authorities, and sincere, honest adherence by the suppliers and consumers. That operations under price control in the waste paper branch have been far from ideal is due to the partial failure of all three factors. The Government has made a sincere and honest effort to set the schedules up right—they have failed to some extent in this but the blame can be placed as much on the waste paper dealer and the paper mill, as it can be on inefficiency in the O.P.A. Distrust and lack of cooperation among dealers and among mills and between these two groups can only result in the authorities takings things in their own hands; inexperienced hands which could be intelligently and honestly guided by the two factors in this specialized industry. Yes, the failure of some mills and some dealers to play the game, among themselves and with the other, is the principal reason for the results to date. Teeth that bite, rules that are rigidly enforced upon all, without exception, is the need and the hoped-for solution.

The Rag Situation

The above remarks apply chiefly to waste paper. If there have been any flaws in the old rag set-up they have been negligible and largely corrected. The new rag situation has been such that to date there has been no necessity for price control. This market has not run away with itself although values are without exception higher than they were in the beginning of 1941. Imposition of Price Control is not unlikely however, the minute that a real spurt in the market should occur. With export out of the picture it is difficult to see how the market could get out of hand.

Prices at the beginning of 1941 were the lows of the year. Increases were gradual through the first half and June saw the first spurts which lead to application of price control, first on the "big three", mixed, news and corrugated, in July and subsequently on the other grades of waste paper, in October, and on old rags in December. November saw modifications of the waste paper schedule and establishment of brokers' commission to be charged in addition, of from 4 to 9% of the fob value. This was essential to the continuance in business of the brokers who service the mills with large tonnages, purchased from a variety of smaller suppliers.

Prices on Key Grades

In the schedule below will be found prices on the key grades of waste paper, rags and fiber specialties. Three prices are indicated. Those applying as of January 1, 1941, the highs reached before imposition of O.P.A. ceilings and the O.P.A. ceilings in effect at the year end, or the free market prices applying at the year end as the case may be. The prices of grades not affected throughout the year by official ceilings mentioned in the second column are the prices in effect at mid-year. O.P.A. prices in the third column are indicated by an asterisk. All are fob New York prices except on "books" and "roofing rags."

Grade	1	2	3
No. 1 Mixed Papers	$5.50	$11.50	$14.00* per ton
Folded News	9.00	13.50	15.00* per ton
Old Corrugated Boxes	10.00	16.00	16.50* per ton
Old Kraft Papers	23.00	45.00	35.00* per ton
Old Kraft Corrugated	17.00	35.00	27.00* per ton
No. 1 Books	20.00	36.00	31.50* per ton
No. 1 White Ledgers	30.00	48.00	43.50* per ton
No. 1 Colored Ledgers	23.00	40.00	37.50* per ton
No. 1 Hard White Shaving	48.00	77.50	57.50* per ton
No. 1 Soft White Shavings	44.00	62.00	50.00* per ton
No. 1 White Envelope Ctgs.	60.00	82.50	62.50* per ton
Kraft Envelope Cuttings	50.00	75.00	65.00* per ton
No. 2 Roofing Rags	22.00	39.00	29.00* per ton
No. 1 Old White Rags	3.25	4.25	3.80* per 100 lbs.
No. 1 White Shirt Cuttings	6.50	6.25	8.25 per 100 lbs.
No. 1 Unbleached Muslins	6.35	6.25	8.50 per 100 lbs.
Percale Print Cuttings	3.50	3.75	5.00 per 100 lbs.
Blue Overall Cuttings	4.50	4.75	6.00 per 100 lbs.
Fancy Shirt Cuttings	1.75	2.75	3.75 per 100 lbs.
Light Flannelettes	4.00	4.50	5.50 per 100 lbs.
No. 1 Light Silecias	4.25	4.50	5.00 per 100 lbs.
No. 1 Domestic Manila Rope	5.50	5.75	6.75 per 100 lbs.
No. 1 Foreign Manila Rope	5.25	5.75	Nominal
Soft Jute Strings	3.25	4.25	4.50 per 100 lbs.
No. 1 Sisal Strings	2.25	2.75	3.50 per 100 lbs.
No. 1 Jute Bagging	2.50	3.75	4.50 per 100 lbs.

A Critical Period

We are in a new year, the most vital in the country's history. It is not merely to be hoped or prayed for, that this greatest of all nations operates as a whole to the full limits of all its tremendous capabilities, and each individual, group, business, factory and industry exceed its previously estimated limits; it is absolutely necessary, if we as a nation, in all that comprises the nation, are to survive. The papermaking industry and its necessary adjunct, the waste material industry have places which rank high in the scale of necessity. May they do their part and do it well.

Shortess Mills to Continue

Arrangements were concluded at a recent meeting of the board of directors of the Federal Paper Board Company, Inc., to carry out the wishes of Mrs. William G. Shortess, who inherited the properties from her late husband and to continue the policies established by Mr. Shortess, who founded the business.

John R. Kennedy, who has been associated with Mr. Shortess for a number of years as assistant to the president, was appointed president of the Federal Paper Board Company, Inc., of Bogota, N. J., Acme Paper Board Company and Midvale Paper Board Company, Inc

Howard T. Brown, who started his career in the industry twenty-nine years ago with Mr. Shortess and in recent years has had charge of production at the Versailles and Montville, Connecticut, plants, was appointed president of the Inland Paper Board Company, Inc., vice-president of Federal Paper Board Company, Inc., and vice-president of Midvale Paper Board Company, Inc.

A. G. Freas was appointed president of the Liberty Paper Board Company, Inc., Steubenville, Ohio, and vice-president of Acme Paper Board Company. He has also had long experience in the industry and has been associated with Mr. Shortess for many years.

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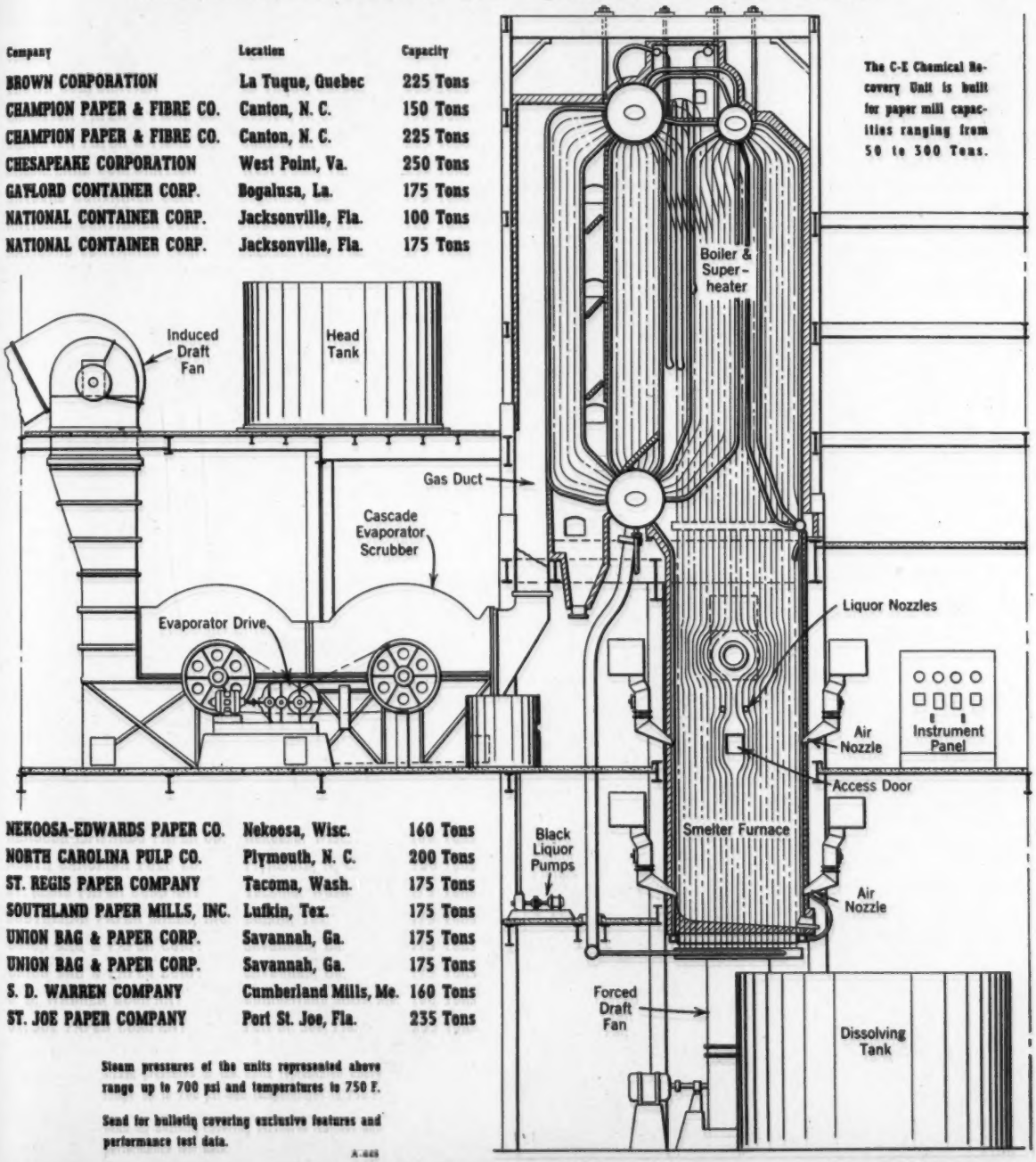
Company	Location	Capacity
BROWN CORPORATION	La Tuque, Quebec	225 Tons
CHAMPION PAPER & FIBRE CO.	Canton, N. C.	150 Tons
CHAMPION PAPER & FIBRE CO.	Canton, N. C.	225 Tons
CHESAPEAKE CORPORATION	West Point, Va.	250 Tons
GAYLORD CONTAINER CORP.	Bogalusa, La.	175 Tons
NATIONAL CONTAINER CORP.	Jacksonville, Fla.	100 Tons
NATIONAL CONTAINER CORP.	Jacksonville, Fla.	175 Tons
NEKOOSA-EDWARDS PAPER CO.	Nekoosa, Wisc.	160 Tons
NORTH CAROLINA PULP CO.	Plymouth, N. C.	200 Tons
ST. REGIS PAPER COMPANY	Tacoma, Wash.	175 Tons
SOUTHLAND PAPER MILLS, INC.	Lufkin, Tex.	175 Tons
UNION BAG & PAPER CORP.	Savannah, Ga.	175 Tons
UNION BAG & PAPER CORP.	Savannah, Ga.	175 Tons
S. D. WARREN COMPANY	Cumberland Mills, Me.	160 Tons
ST. JOE PAPER COMPANY	Port St. Joe, Fla.	235 Tons



The C-E Chemical Recovery Unit is built for paper mill capacities ranging from 50 to 300 Tons.

Steam pressures of the units represented above range up to 700 psi and temperatures to 750 F.

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Paper Week in New York Largely Attended

George H. Mead, President of Mead Corp., Elected President of American Paper and Pulp Association At Sixty-Fifth Convention At Waldorf-Astoria Hotel — Affiliated Associations Also Meet.

The Sixty-fifth annual convention of the American Paper and Pulp Association and its numerous affiliated organizations was held at the Waldorf-Astoria Hotel, February 15-20 inclusive.

The leading event of the opening session on Monday was the association luncheon at 1 P. M. on the starlight roof of the hotel, with addresses by J. L. Riegel, R. L. Weldon, J. R. Kimberly and R. B. Robertson, Sr. President Riegel introduced George Sisson, Jr., president of the Racquette River Paper Company, as the "dean of the paper industry". Mr. Sisson spoke briefly of the fine leadership of the A.P.P.A. and the praiseworthy solidarity which has been achieved by the industry.

J. L. Riegel, who retires and is succeeded by George H. Mead, as president of the American Paper and Pulp Association, delivered the following address:

Address of J. L. Riegel

It is with real regret that I make my final report to you as President of the American Paper and Pulp Association. While personal considerations made my withdrawal essential, the affairs of the Association can be promoted as well or better by any of a number of the strong leaders within the industry. The Association is broadened and strengthened by the infusion of new ideas that come with the appointment of new leaders and, at the same time, it can count on the knowledge and the experience of the retiring leaders.

When I assumed office two years ago, I was convinced that it was essential to the future of the United States that each industry think and function as a unit, endeavoring to contribute a maximum to the aims and economy of the whole country. A completely selfish policy of an individual company or of an association of companies menaces the whole future of the country.

The terrible events of the past two years have speeded the pulp and paper industry along the road of constructive industry planning, and we can properly be proud of our progress. An increasing number of individuals from the industry are devoting a large part of their time and energy to solving industry problems. Many companies which previously had insisted on complete independence of action have become active members of Divisions. Several branches of the industry which were not part of the American Paper and Pulp Association have applied for membership. The Association itself has been principally concerned with industry planning, particularly as it relates to a successful prosecution of the war.

I do not for a moment advocate for the industry blind submission to Government planning or for each company a wooden conformance to an industry plan. The free tradition of the United States makes each of us try to see that the Government plan is the best possible one, and the genius of the American people for individual initiative makes each company strive for its maximum development within the framework of the industry plan.

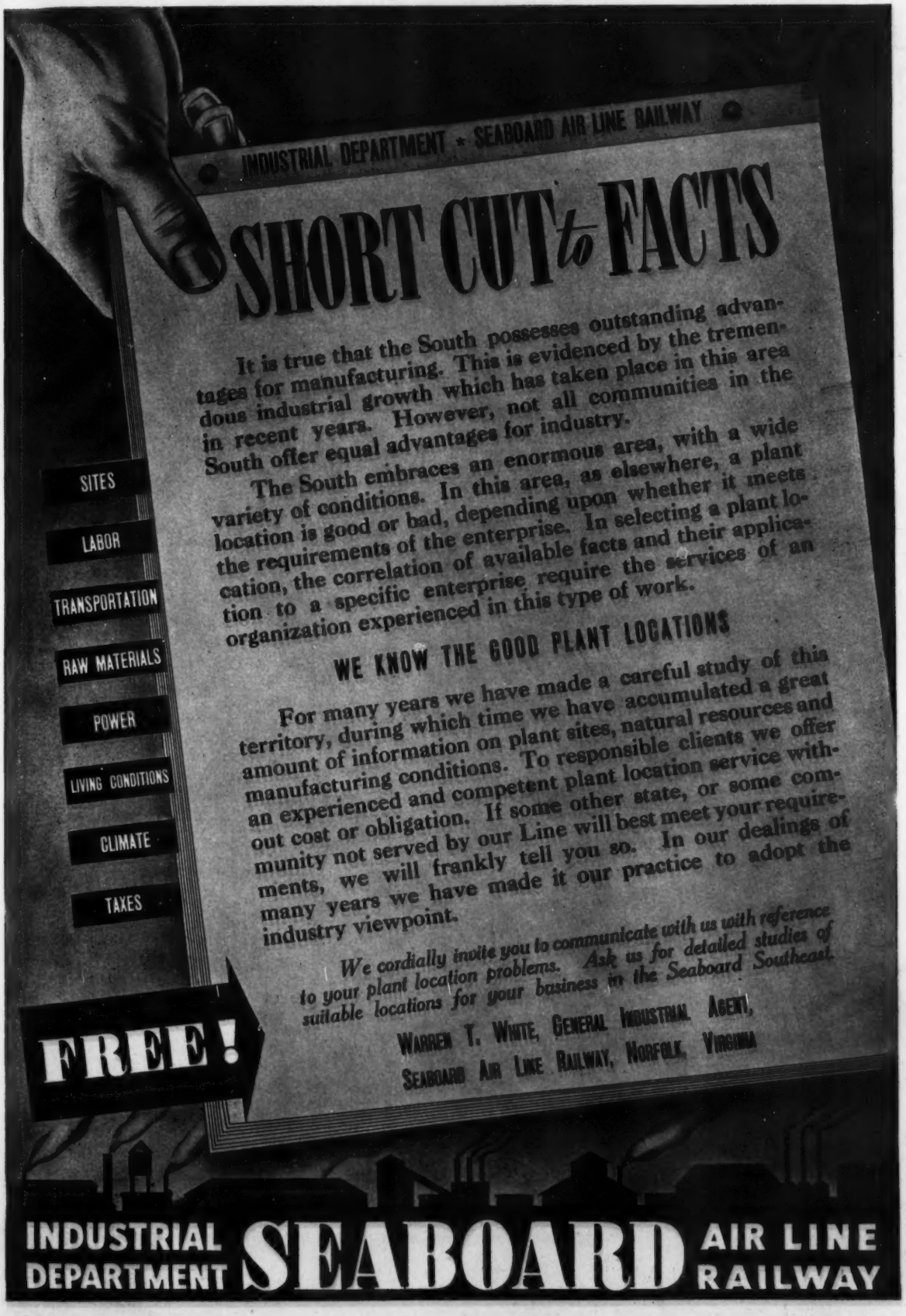
During the past year the industry was able to make its greatest contribution to the country through maximum operation, as pulp, paper and board were needed to replace many scarce materials. The production achieved was 19% over the previous record year, 1940, and 9% greater than Government officials thought possible a year ago.

We can all be proud of the results achieved. I am certain that the result would have been different and less satisfactory if the Government planning had not had the assistance of many individuals from the industry serving the Government officially and unofficially, together with the help of many industry committees.

G. H. Mead, President

If we can best serve our country in 1942 by securing maximum production, production of paper and board could be increased another 10% over 1941. However, the main purpose of the industry is to defeat the Axis, whatever it costs each of us individually, and we will adopt the plan that best meets that end, whether it is by maximum operation or by curtailment. We can guarantee the country that, if curtailment is necessary, we will produce every pound possible with the materials available, and that the Government will have first call on what we produce.

As problems affecting the industry are presented to the various Government Departments, the or-


INDUSTRIAL DEPARTMENT ★ SEABOARD AIR LINE RAILWAY
SHORT CUT to FACTS
It is true that the South possesses outstanding advantages for manufacturing. This is evidenced by the tremendous industrial growth which has taken place in this area in recent years. However, not all communities in the South offer equal advantages for industry.
The South embraces an enormous area, with a wide variety of conditions. In this area, as elsewhere, a plant location is good or bad, depending upon whether it meets the requirements of the enterprise. In selecting a plant location, the correlation of available facts and their application to a specific enterprise require the services of an organization experienced in this type of work.
WE KNOW THE GOOD PLANT LOCATIONS
For many years we have made a careful study of this territory, during which time we have accumulated a great amount of information on plant sites, natural resources and manufacturing conditions. To responsible clients we offer an experienced and competent plant location service without cost or obligation. If some other state, or some community not served by our Line will best meet your requirements, we will frankly tell you so. In our dealings of many years we have made it our practice to adopt the industry viewpoint.
We cordially invite you to communicate with us with reference to your plant location problems. Ask us for detailed studies of suitable locations for your business in the Seaboard Southeast.
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ganization and the economic and statistical data of the American Paper and Pulp Association have proved invaluable. The existence and background of the Association have made possible the formation of representative committees from the industry that could quickly advise the Government. Many of you have served on these committees. Among important problems undertaken by these committees have been Standardization and Simplification of Paper Grades, Conservation of Chlorine and Critical Metals, Utilization of Idle Machine Shop Time.

Under a constantly changing war economy, rapid and drastic changes in the industry will be necessary. In many cases Governmental action will be desirable to make these changes on an orderly basis. Within the industry, however, we will see that action is going to be necessary, and I believe it would be desirable for the industry to draw up special committees to study these more acute problems and to present to the Government plans for their solution. Among these problems are the supply of pulpwood, wood pulp, waste paper, and paper.

While the principal effort of the Association has been on problems arising out of the war, the normal activities of the Association have progressed steadily. It has been operated economically and been much strengthened financially. It has continued to render regularly the various services with which you are familiar.

It is more important than ever before that the industry stand together behind a program based upon sound national conception of what it can and should do under these vastly changing conditions. The industry should unite to give the country the maximum benefit of its extraordinary elasticity, its technical skill and ingenuity. The American Paper and Pulp Association is engaged in this program and deserves the support of every member of the industry.

I want to express my sincere thanks to the members of the industry and the Secretaries of the Divisional Associations for the support and cooperation which they have given me and the staff of the American Paper and Pulp Association during the past two years, and know that my successor is assured of that same whole-hearted support for the future.

Address of R. E. Weldon

R. E. Weldon, president of the Canadian Pulp and Paper Association spoke in part as follows:

Our two Associations have much in common. They are similar because they both represent the pulp and paper industry. They are dis-similar because our industry is largely—though not entirely—an export industry, whereas your industry is largely—though not entirely—a home industry. This is an important difference. It naturally makes for a different outlook. Like all good Americans and Canadians we retain such differences in outlook.

This pulp and paper industry is our largest single industry. As such it is a major importance to Canadian economics, reaching deeply into the lives of a large percentage of our population. You are, therefore, no doubt interested as to how the industry has carried on under war conditions for the past two and a half years.

The common problem in the production of war materials was machine tools. The industry had repair shops—good ones—so they too were put to work. Through subcontracting for those parts of war materials which formed bottlenecks in the plants of prime contractors added output was achieved. This was done through the Wartime Machine Shop Board of the Association. The Board has a full time engineering staff which coordinates the work between prime contractor and subcontractor—and collaborates with the Department of Munitions and Supply. There is only one basic test applied by our coordinator to each subcontract job which comes to the industry's repair shops, provided of course the work can actually be handled in the shop. This test is—will this particular subcontract add to the war production. No subcontract that does not pass this test is ever accepted. The production of mechanical parts from the repair shops of the industry will approximate $5,000,000 in 1942, but is worth much more since it clears bottlenecks in prime contractor's munition plants.

Address of J. R. Kimberly

J. R. Kimberly, formerly connected with the Kimberly-Clark Corp., and now Supervisor of Industrial and Office Machinery, Pulp and Paper, Printing and Publishing, Transportation and Farm Equipment and Communications Branches of the War Production Board, outlined the activities of the War Production Board and the relationship of paper to the war production program.

The paper industry has done a grand job thus far, said Mr. Kimberly, but the pressure on the industry is going to increase. We must proceed wholeheartedly with the war effort and those who don't fall in line will have to stand the consequences.

The shortages of metals is very real and very serious. You can do your part to conserve essential metals by studying closely every use you make of them in every detail of your work—regardless of whether you feel you are conserving more than the other fellow.

The changing conditions make for changing requirements of course and we just cannot say what the situation is going to be a few months ahead. For instance, copper, already restricted, may become tighter and affect the supply of copper for fourdrinier screens. It therefore is vitally important that you keep all your equipment in the best possible state of repair. It will be unwise to buy a new machine to replace one that is only partly worn—we need every single one of such savings of materials as you are able to effect. Machinery manufacturers for the pulp and paper industry will be called on to do even more war work.

It will be much more difficult to operate a paper mill six months or a year from now than it now is. For instance, labor may be more difficult to obtain. It may be advisable to institute training programs with a view to getting more women workers. A power shortage as you know may affect the paper industry, but we feel we can work with the industry on power as we will have to do on transportation.

There has been considerable talk about possible pulp shortages but we don't know just what the situation will be. We ask you to look at the over-all problem and realize what we are trying to do. We ask for cooperation and constructive criticism—don't tear down unless you have a constructive program to offer as a replacement.

We really have our backs pretty much against a wall and conditions in the Far East mean a much longer war than had been previously in the picture. Unless we bring the war right down into our own lives and think of it daily and on Sundays we are

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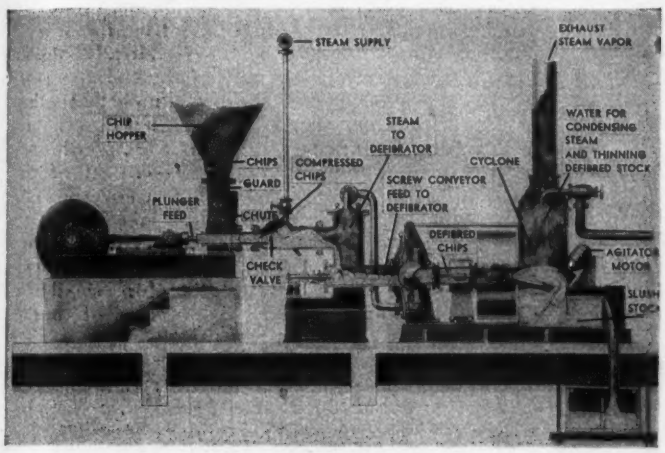
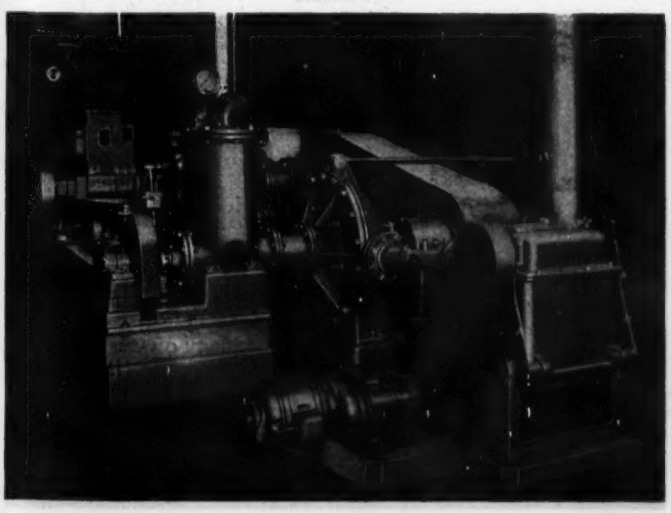


Flofoto of the DEFIBRATOR used for defibering wood chips, showing action from chips to slush stock. (U. S. Patent Numbers: 2,145,851—2,008,892—2,047,170. Canadian Patent Numbers: 337,404—335,302—355,303.) Patented in Foreign Countries.



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going to be in a dangerous position—we might even lose the war. We know what we have to do and we know there is no other way out.

Address of R. B. Robertson, Sr.

R. B. Robertson, Sr., executive vice-president of the Champion Paper and Fibre Company, Canton, N. C., followed Mr. Kimberly.

Some of you are acquainted with my friend Sir Herbert Gepp of the Australian Papermakers and may have heard the story of the two young men who were pursued by a bull across a pasture. The bull was gaining on them dangerously and was about to overtake them when one of the boys took refuge in a tree while the other took refuge in a nearby cave. The boy in the tree settled down to wait patiently for a suitable opportunity to escape; the boy in the cave, however, every little while would dash out only to be chased back into the cave by the bull. Finally the fellow in the tree shouted "you better quit that Buddy or the bull will get you." Buddy replied, "you don't understand the local conditions, there's a bear in that cave."

In these times of great anxiety for us all it is a great comfort to know that we have in Washington in a position of authority a man of Mr. Kimberly's character and experience. We can confidently rely on his sympathetic understanding of our "local conditions". The conditions peculiar to the paper industry. We can rely on his appreciation of the fact that we frequently find ourselves caught between the bull of increasing costs and the bear of price ceilings. We know he will administer his office with the utmost fairness and a glacial impartiality.

In the present emergency the maintenance of continuity in paper operations is of very great importance to you and to me. In the eyes of the nation, however, we must admit that it does not rank with such vitally important defense needs as tanks, planes, ammunition and ships. We all know that time is running against us in this war and that we must help in every way possible in the quick production of vital defense necessities. We must do not only the things we are asked to do but must go further and seek ways by which we can be helpful. After we have fulfilled our obligations in this particular with generous good measure, then can with propriety turn back to the needs of our own industry and I see no objection to making "business as usual" our slogan so long as it is always specifically conditioned on war needs taking precedence. We need business as usual to produce the taxes which must pay for our war effort.

We need business as usual to produce payrolls which through lessening the relief rolls leaves more money available for war needs. We need business as usual to promote civilian morale. Unemployment and business confusion certainly lessen the courage and steadiness of purpose of the civilian population who after all indicate if they do not dictate our national policies.

War time activities necessarily mean the concentration of power in Government. Power to do the things which defense requires and to push aside those things which interfere with defense.

When defense needs are taken care of all remaining matters so far as practical should be left to the field of private enterprise. This is true for several reasons. Government agencies are already almost overwhelmed with the enormity of the task of creating in a few months defense facilities that other nations have taken years to produce. I believe it just to say that there are people in this country who are eager to see everything possible taken out of the realm of private enterprise and made a governmental responsibility. Some are willing to take advantage of war time conditions in order to put their theory into effect. These theorists constantly shout that private enterprise has failed and therefore should be replaced. Private enterprise has its faults, of course, but it has not failed any more than democracy has failed because congressmen and other men in public office pass pension bills, fail to appreciate the real defense needs and let valuable and irreplaceable years pass in boondoggling.

E. W. Tinker, Secretary

Private enterprise should seize and reserve for itself all opportunities that may come to it for solving the problems of commerce and industry without calling for action by governmental bureaus.

In the paper industry we are bound to have many problems which can either be handled by the industry itself or by a government bureau. We should in my judgment take and hold the initiative in disposing of these intra industry problems.

Many of you remember the days of NRA and the monthly meetings which we used to hold. The NRA had its many faults, of course, but I believe it had much of constructive value to its credit—many of us had been suspicious and aloof from our competitors—many of us believed that some of them would steal the gold from the teeth of a dying saint—the personal friendly conferences of NRA very shortly allayed suspicion

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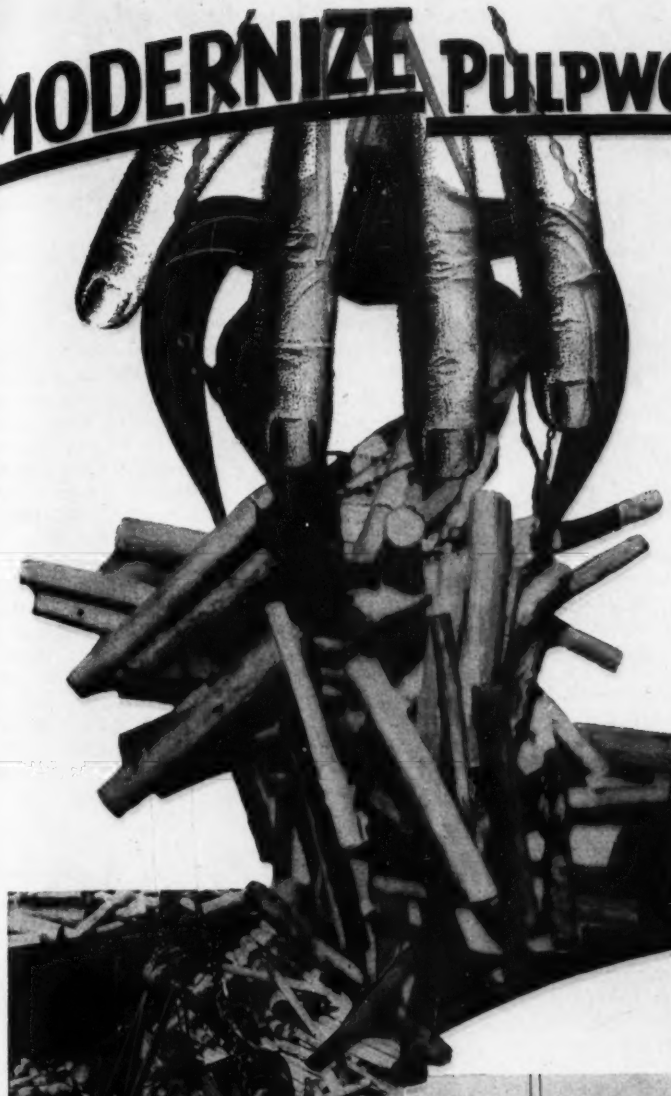

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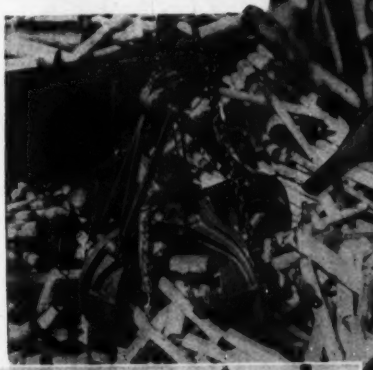

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and gave opportunity for constructive effort. It is not necessary today any more than it was then to regard every competitor with doubt and suspicion—some of you may recall the incident that is said to have taken place between Mark Hanna and Joe Cannon—both were hard headed politicians and enthusiastic poker players and played together frequently. On one occasion someone had given Uncle Joe a very beautiful necktie and he had worn it when he went to the poker game with Mark Hanna. Uncle Joe was notoriously generous in the use of chewing tobacco, when he returned from this game, the donor of the tie discovered that it was saturated with tobacco juice and utterly ruined and he asked Uncle Joe how it happened—Uncle Joe replied "you can't look where you spit when you play poker with Mark Hanna."

I'm afraid some of us in the paper industry feel that we can't look where we spit when we deal with our competitors.

I feel this emergency demands that we call a truce on suspicions and aloofness and that we all think industry-wise and for the maintenance of private enterprise. We should endeavor to alleviate as much as we can the penalties of business derangement which may fall with especial severity on certain members of our industry.

In all struggles the holding and maintenance of the initiative is of the utmost importance. We have seen what it has meant in France, in Russia, in Libya and in the Far East. Purely defense policies mean the scattering of forces and permit an aggressor to consolidate his forces and dispose of the smaller forces of his opponent one at a time.

Successful sales, successful industrial relations policies, successful political policies all call for holding the initiative.

In guarding our industry from effect of interferences, necessary or unnecessary, we should hold the initiative just as much and just as long as possible.

Our program of cooperation with the Government should include, briefly stated, the following principles:

1. Do everything in our power to make every second count in production of Defense goods.
2. Having done that in generous measure do everything we can to keep business as usual.
3. Encourage constructive mutual helpfulness within the industry.
4. Hold the initiative in confidence and in constructive spirit.

A. P. and P. A. Elect Officers

At a meeting of Executive Committee and Board of Governors of the American Paper and Pulp Association, the following officers were elected:

President, George H. Mead, President Mead Corporation, New York, N. Y.; 1st Vice President, D. K. Brown, President Neenah Paper Company, Neenah, Wis.; Vice-Presidents, Hugh J. Chisholm, president Oxford Paper Company, New York, N. Y.; R. J. Cullen, president International Paper Company, New York, N. Y.; D. C. Everest, president Marathon Paper Mills Company, Rothschild, Wis.; P. H. Glatfelter Company, Spring Grove, Pa.; James L. Madden, vice-president, Hollingsworth & Whitney Company, Boston, Mass.; John R. Miller, vice-president West Virginia Pulp and Paper Company, New York, N. Y.; Cola G. Parker, vice-president Kimberly-Clark Corporation, Neenah, Wis.; John L. Riegel, president Riegel Paper Corporation, New York, N. Y.; Dwight L. Stocker, president Michigan Paper Company, Plainwell, Mich.; Norman S. Stone, secretary Mosinee Paper Mills Company, Mosinee, Wis.; Norman W. Wilson, president Hammermill Paper Company, Erie, Pa.; J. D. Zellerbach, president Crown Zellerbach Corporation, San Francisco, Cal.

Executive Secretary and Treasurer, E. W. Tinker.

Tissue Association

The Tissue Association held its annual meeting on Tuesday, February 17, at the Waldorf-Astoria Hotel. The following board of governors was elected:

J. M. Conway, president, Hoberg Paper Mills, Green Bay, Wis.; E. E. Grant, vice-president, Crystal Tissue Co., Middletown, O.; B. F. Picola, treasurer, Gotham Tissue Co., Salem, N. Y. and Ross A. Fife, executive secretary.

A. B. Hansen, Northern Paper Mills, Green Bay, Wis.; R. G. Fairburn, Berst-Forster-Dixfield Co., N. Y. C.; F. W. Plowman, Scott Paper Co., Chester, Pa.; Norman Seagrave, Port Huron Sulphite & Paper Co., Port Huron, Mich.; Joel Hartman, Barclay Tissue Corporation, Brooklyn, N. Y.; P. Toye, American Tissue Mills, Holyoke, Mass.; S. Lopin, Mazer Paper Mills, N. Y. C.; B. I. Reider, Victoria Paper Mills, Fulton, N. Y.; R. B. Stevens, Stevens & Thompson Paper Co., Greenwich, N. Y.; R. W. Sweet, Sweet Bros. Paper Mfg. Co., Phoenix, N. Y.; George Bidewell, Adams Paper Company, Wells River, Vt.; S. Wishnick, Park Tissue Mills, N. Y. C.; R. A. Monteith, Pond's Extract Co., N. Y. C.; and Wm. Shafer, Jr., Flower City Tissue Mills, Rochester, N. Y.

Divisional Officers

Roll Toilet Tissue Division—chairman, B. I. Reider, Victoria Paper Mills, Fulton, N. Y.; vice-chairman, Milan Boex, Northern Paper Mills, Green Bay, Wis.

Paper Towel Division—chairman, Sam Lopin, Mazer Paper Mills, New York, N. Y.; vice-chairman, W. J. Servotte, Bay West Paper Company, Green Bay, Wis.

Interfolded Toilet Tissue Division—chairman, R. B. Stevens, Stevens & Thompson Paper Company, Greenwich, N. Y.; vice-chairman—H. G. Witgens, Hoberg Paper Mills, Green Bay, Wis.

Wrapping Tissue Division—chairman, W. Shafer, Flower City Tissue Mills, Rochester, N. Y.; vice-chairman, A. Stone, Mohawk Valley Paper Company, Little Falls, N. Y.

Jumbo Roll Division—chairman, R. W. Sweet, Sweet Bros. Paper Manufacturing Company, Phoenix, N. Y.; vice-chairman, A. Stone, Mohawk Valley Paper Company, Little Falls, N. Y.

Sanitary Absorbent Tissue Division—chairman, R. A. Monteith, Ponds Extract Company, New York, N. Y.

Kraft Tissue Division—chairman, G. Bidwell, Adams Paper Company, Wells River, Vt.; vice-chairman, John Cahill, Crystal Tissue Company, Middletown, Ohio.

In an address on the subject of "What does 1942 hold in store for the Tissue Industry", J. M. Conway, president of The Tissue Association concluded as follows:

As we progress further into 1942, and as the tempo

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With AMYLIQ, mills are not dependent upon any particular kinds of starches or gums. It can be used to convert any of the commercially available raw starches. Purchasers are thus able to take advantage of price differentials and to effect important savings.

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of American production mounts, we can do much to insure the integrity of our industry both now and after the war if we adhere closely to these sound business principles.

(1) Think in terms of our industry and our own business. Study our financial, production and sales problems and correct any weaknesses we find therein. Find our place in the war program, know what we can do, and then do our utmost towards this end.

(2) Keep our financial house in order, so as to cushion the shock of repercussion, which is bound to come after the war is over. Watch cash budgets as it is impossible to pay obligations with paper profits.

(3) Do not speculate on raw material inventory except insofar as is necessary to insure a continued source of supply.

(4) Take the problem of employer and employee relations seriously. Keep abreast of times, and consider this problem of employer and employee relations as one of the most important of management.

(5) Do not be hurriedly moved into any serious or large expansion program because of present conditions, except those necessitated by war production demands.

(6) Don't get panicky at the first sign of a slowing up in business. This fast trend cannot be maintained, and some slowing down and consolidation of gains must take place. A decline in abnormally active business does not mean a depression.

(7) Do your part in the war program voluntarily. This is not only a patriotic duty but essential to our preservation as an individual and as an industry.

(8) One of the wisest policies is the reinvesting of earnings in plants for modernization and maintenance so as to continually produce better quality at a lower cost, thereby insuring your place in the industry and continued employment for your men.

(9) Increase, if possible, production of the emplements of war, and products for civilian use.

(10) Every effort possible should be made to conserve and reclaim materials.

(11) We should cooperate in the selective service and conserve man power.

If we keep these points in mind, we will be in a position to withstand almost any of the uncertain developments which may come in the future.

If we are to make the most of a difficult situation that is to come, it is essential that Labor, Capital and Government work together. Labor relations in the paper industry have been most satisfactory and every indication points to a continuation of this harmonious relationship. Capital and Government are closer than at any time in the past ten years. I, for one, look forward to a year of hard work and sacrifice made easier by the cooperation of all and the realization that this job ahead of us is not for labor to solve, not for management to solve, not for Government to solve, but one which will be solved by the united efforts of all three. It is a problem that goes to the roots of our lives and will affect the future living conditions of our children for many years to come. If we fail, it will mean the end of a way of life which we have enjoyed, but have not really appreciated for the past 150 years.

In the past, many have looked to the Tissue Association saying, "What can the association do for me?" Let us give some thought to what the condition of the Industry would be if there were no Associations to guide us and help us especially during these trying times. We need the Association, and the Association needs us. If we expect to take anything, we must also be ready to give. Instead of asking, "What can the Association do for me?", let us ask, "What can I do to help the Association which will benefit me and my industry."

Salesmen Hold Meetings and Luncheon

The Salesmen's Association of the Paper Industry held its Twenty-third annual meeting at the Waldorf-Astoria Hotel on Monday, February 16, at which the following officers were elected: president, Courtney H. Reeves, Allied Paper Mills; Eastern vice-president, Norman Beardsley, Union Bag & Paper Corp.; Western vice-president, Burt. B. Fisher, Bergstrom Paper Co.; Eastern assistant vice-president, Stanley O. Styles, Martin Cantine Co.; Western assistant vice-president, Forest Patterson, Flambeau Paper Co.; secretary-treasurer, E. O. Merchant, 122 East 42nd street, New York.

The annual luncheon of the Salesmen's Association of the Paper Industry was held in the grand ballroom of the Waldorf-Astoria Hotel with nearly 1500 members and guests present. Oscar of the Waldorf said that it was the largest luncheon of paper men he had ever served.

Seated at the speaker's table were the following: John L. Riegel, president, American Paper and Pulp Association; Oscar Stamets, president, American Pulp and Paper Mill Superintendents' Association; E. W. Tinker, executive secretary, American Paper and Pulp Association; John D. Johnson, president, Salesmen's Association of the Paper Industry; Courtney H. Reeves, vice-president, Salesmen's Association of the Paper Industry; Norman T. Beardsley, vice-president, Salesmen's Association of the Paper Industry; Eugene Peeples Thomas, president, National Foreign Trade Council, Inc.; W. S. Swingle, vice-president, National Foreign Trade Council, Inc.; A. E. Cadman, secretary, Canadian Pulp and Paper Association; Walter C. Shorter, assistant director of purchases, War Purchase Board, and E. O. Merchant, secretary, Salesmen's Association of the Paper Industry. Norbert A. McKenna, chief, Pulp and Paper Branch, War Production Board, was a special guest.

President John D. Johnstone presided and delivered his annual message in which he named Courtney H. Reeves his successor. At the conclusion of the main address, President Reeves paid tribute to Mr. Johnstone the retiring president and presented him with the association's medal which is awarded to past presidents, fourteen of which were presented at the luncheon last year.

The guest speaker was Eugene Peeples Thomas, president, National Foreign Trade Council, Inc., who spoke on "Economic Accord Among the United Nations". Mr. Thomas in pointing out that the paper industry has an important part to play in meeting the Government's requirements for the war effort, said that the status of war preparation involves the various branches of the paper industry in a complexity of problems, which is a task for round-table discussion and solution. He declared that the measure of the task before the American manufacturers, may be gauged by the fundamental changes in their domestic and foreign trade; that we cannot longer apply the yardstick of reciprocity to our trade with those countries that are our allies. As the war progresses, Mr. Thomas said, it is probable that we shall receive less

and less in imports and furnish more and more goods for export. Meanwhile, we are paying cash for our imports and investing large sums in the development of strategic materials abroad. This situation will prevail for sometime after the war but, of course, we cannot continue indefinitely to buy more than we sell.

In concluding, the speaker said that the economic life of the nation is at stake in this war, and with it the future of all American industries. We must learn to think both nationally and internationally, he declared, if we would profit by that wider consultation and collaboration in international affairs that make for general accord and freer intercourse between nations.

Specialty Paper and Board Affiliates

At sectional meetings of the Specialty Paper and Board Affiliates Tuesday, February 17, Hotel Waldorf-Astoria, New York, the following group chairmen were elected: Tag and file folder, E. R. Lyman, Missiquoi Corporation; bogus bristol, S. B. Sutphin, Beveridge Paper Company; and mill blank, Kendall Wyman, Champion Paper and Fibre Company.

Election of officers is scheduled to be held in March, at either the Waldorf-Astoria or the Barclay. The latter hotel also is situated in New York.

Held Wednesday, February 18, was the election of the executive committee. The following were named: P. R. Bachman, Riegel Paper Corporation; Edward Bailey, Hollingsworth & Whitney Company; T. Stewart Foster, Foster Paper Company; W. S. Gamble, Brownville Board Company; H. S. Lewis, J. P. Lewis Company; George E. O'Conner, Mohawk Paper Mills; Walter B. Sheehan, Missisquoi Corporation; S. B. Sutphin, Beveridge Paper Company; Kendall Wyman, Champion Paper & Fibre Company; Louis E. Vose, Hollingsworth & Vose Company.

Guest speaker, at the organization's general meeting held Wednesday, February 18, was Robert M. Macy, chief of the Pulp and Paper Section, Office of Price Administration. He announced that "appendix C pertaining to specialty boards is being transferred from the paperboard price schedule No. 32 to a voluntary agreement." In turn, he added, OPA is "placing schedule number 32 under the price law."

Mr. Macy declared, "Our primary interest in reviewing profits data is to single out the high cost concerns and determine the level of prices necessary to keep them in business. These data are looked upon as highly confidential, and are not available for inspection by any other Federal agency."

Paper Mill Supply Dealers Banquet

The thirty-fourth annual banquet of the New York Association of Dealers in Paper Mills' Supplies was held at the Hotel Commodore on Tuesday evening, February 18. As on previous occasions, a huge birthday cake, bearing candles in celebration of the forty-second anniversary of the founding of the association, was presented in a fitting ceremony. About 400 members and guests gathered to enjoy a delightful dinner and a splendid program of entertainment. It was a friendly and enthusiastic gathering which in many ways showed its appreciation for the excellent arrangements planned by the committee in charge.

Tables were reserved by the following:—Atlantic By-Products Corporation, Atterbury Brothers, Inc., Barone Brothers, D. Benedetto, Inc., Robert Blank, Alfred Bloch & Co., John H. Carlo & Sons, Inc., James Carrano's Sons, Inc., Castle & Overton, Darmstadt, Scott & Courtney, Derrico Company, Inc., Economy Baler Company, Eolio Corporation, Federal Waste Paper Corporation, Fischetto Paper Mill Supply, Inc., James T. Flannery Company, Inc., Gaccione Brothers & Co., Inc., Gallo Waste Paper Stock, Harris Goldman Company, Louis Gottlieb & Co., Inc., Great Eastern Packing and Paper Stock Corporation, John D. Greco, Inc., W. J. Green Company, Inc., Daniel M. Hicks, Inc., Hicks-Costarino Company, Inc., E. J. Keller Company, Inc., Lipman Brothers Corporation, Loumar Textile By-Products, Inc., Marchisello Brothers, Charles Maronna & Co., Inc., N. Mastronardi Sons, Inc., George W. Millar & Co., Inc., Alfred J. Moran, National Association of Waste Material Dealers, Prospect Street Paper Stock Company, Inc., Ruberti Salvage Company, Hon. Joseph T. Sharkey, William Steck & Co., Inc., Sterling Mill Supply Company, Inc., Harry Stone, Sunrise Waste Material Company, Toga Paper Stock Company, Inc., Valva Paper Stock Company, Walker-Goulard-Plehn Company, Inc. and Wilson Paper Stock Company, Inc.

The banquet committee was composed of Walter H. Martens, chairman; John L. Nielsen and Arthur Rosenfeld. Mr. Martens, who had been present at all the previous banquets, was prevented by illness from being present this year and was greatly missed by his many friends.

The officers of the association are as follows:—Arthur Rosenfeld, president; John L. Nielsen, first vice-president; Gus R. Holm, second vice-president; Alfred J. Moran, secretary-treasurer.

Paper Makers Advertising Association

A specific war-time program for the paper industry's advertising managers was outlined Wednesday, February 18, by F. B. Heitkamp at the Paper Makers Advertising Association's annual luncheon held in the Hotel Lexington, New York. Mr. Heitkamp is vice-president of American Type Founders Sales Corporation.

Mr. Heitkamp advocated: (1) Education of the salesman at the point of contact with the customer, to guard against inflation now and after the duration; (2) a consciousness that "we are in a war," meaning the advertising manager must realize that everyone will be hit by the war, that cheerful sacrifice in stock or quantities of paper is part of the job to help win the war, and that for the duration there are no competitors, that—instead—the industry is one large advertising and selling organization awakening John Q. Public to do his part in the current struggle.

The following companies are members of the Paper Makers Advertising Association: Albemarle Paper Mfg. Company, American Writing Paper Corporation, Appleton Coated Paper Company, Beckett Paper Company, Martin Cantine Company, Chemical Paper Manufacturing Company, Crocker-McElwain Company, Hampden Glazed Paper & Card Company, International Paper Company, Knowlton Brothers, Marvellum Company, McLaurin-Jones Company, Mead Corporation (Mead Sales Company, Wheelwright Papers, Inc., and Dill & Collins, Inc.), Mohawk Paper Mills, Northwest Paper Company, Riegel Paper Corporation, Sorg Paper Company, and Strathmore Paper Company.

Following the luncheon, the organization held its annual business meeting. At this time the following officers were re-elected: President, Maurice A. Park, Marvellum Company; eastern vice-president, Richard A. Faulkner, International Paper Company; western vice-president, E. S. Colvin, Appleton Coated Paper Company; treasurer, Floyd L. Triggs, Riegel Paper Corporation; secretary, Bradley E. Stafford, Strathmore Paper Company.

American Pulpwood Association

The American Pulpwood Association held its annual meeting Thursday, February 19, at the Hotel Waldorf-Astoria, New York. The group elected the following board of directors:

Northeastern region: W. R. Brown, Brown Company; F. G. Knights, New York & Pennsylvania Company; W. E. Becraft, International Paper Company; G. D. Bearce, Maine Seaboard Paper Company.

Appalachian region: W. P. Bullock, Mead Corporation; W. D. Comings, West Virginia Pulp and Paper Company; Paul Koenig, Glatfelter Pulp Wood Company; W. S. Mundy, Jr.

Southern region: C. O. Brown, International Paper Company; C. E. Smith, Champion Paper & Fibre Company; W. D. Cole, Union Bag and Paper Corporation; R. H. Laftman, National Container Corporation.

Lake states region: C. H. Sage, Kimberly-Clark Corporation; A. B. Hansen, Northern Paper Mills; J. M. Conway, Hobert Paper Mills, Inc.; A. M. Fox, Von Platen-Fox Company.

At large: J. O. Lynch, Eastern Corporation; W. T. Brust, Temperance River Company; W. L. Cobb. Eastern Pulp Wood Company; C. L. Fisher, Fisher Forestry and Realty Company; E. A. Sterling, Johns-Manville Corporation; F. A. Kelly, Northwest Paper Company; H. D. Camp, Chesapeake-Camp Corporation; W. J. Damtoft, Champion Paper and Fibre Company; L. J. Freedman, Penobscot Development Company.

Writing Paper Mfrs. Association

The writing Paper Manufacturers Association at its 81st annual meeting, held on Tuesday, February 17, 1942, elected the following officers for the ensuing year: president, J. D. Zink; vice-president, H. H. Hanson; vice president, M. D. Bardeen; executive secretary and treasurer, M. C. Dobrow, and assistant secretary, G. V. Johnson.

Executive Committee: chairman, J. D. Zink, Strathmore Paper Company, West Springfield, Mass.; H. R. Baldwin, Hammermill Paper Company, Erie, Pa.; M. D. Bardeen, Lee Paper Company, Vicksburg, Mich.; G. H. Beckett, the Beckett Paper Company, Hamilton, Ohio; H. V. Burgee, Persons Paper Company, Holyoke, Mass.; D. D. Coffin, C. H. Dexter & Sons, Inc., Windsor Locks, Conn.; Bruce Crane, Crane & Company, Inc., Dalton, Mass.; I. N. Esleeck, Esleeck Manufacturing Company, Turners Falls, Mass.; R. D. W. Ewing, American Writing Paper Corporation, Holyoke, Mass.; W. J. Garrity, The Munising Paper Company, 135 South LaSalle street, Chicago, Ill.; A. C. Gilbert, Gilbert Paper Company, Menasha, Wis.; H. H. Hanson, W. C. Hamilton & Sons, Miquon, Pa.; J. E. Holmes, Crocker-McElwain Company, Holyoke, Mass.; R. S. Madden, Mohawk Paper Mills, Inc., Cohoes, N. Y.; E. A. Oberweiser, Fox River Paper Corporation, Appleton, Wis.; A. C. Remley, Nekoosa-Edwards Paper Company, Port Edwards, Wis.; F. H. Savage, International Paper Company, 220 East 42nd street, New York, and W. B. Zimmerman, The Maxwell Paper Company, Franklin, Ohio.

Paper Club of New York Banquet

The Paper Club of New York held its annual banquet Wednesday evening, February 18, in the grand ballroom of the Hotel Waldorf-Astoria, New York. This was Paper Week's entertainment highlight, and more than 600 paper men were in attendance.

Featured professional entertainers were George Jessel of "High Kickers" and Walter O'Rourke of "Sons o' Fun." The complete program included: Murray White, master of ceremonies; the national anthem, Harriet Carr; Elaine Seidler's "debutantes"; Walton and O'Rourke, of Olsen & Johnson's "Sons o' Fun"; Ben Yost's varsity eight; Trixie, currently at the Paramount Theatre; Master and Rollins; Yola Galli, of the Rainbow Room; Four Macks; George Jessel; and Art Paulson and his Hotel New Yorker orchestra.

Irving Slote, counsel for the Paper Association of New York, was presented with a birthday present, since the anniversary coincided with the banquet date.

Officers of the club are: Arthur W. Pohlman, president; George W. Johnston and Fred P. Appleton, vice-presidents; Stanley O. Styles, treasurer and Alfred S. Walden, secretary.

The banquet committee: Stanley H. Andrews, chairman, Fen K. Doscher, Lewis R. McCurdy, E. F. Miles, Harry Miller, H. P. Price and Charles C. Walden, Jr.

Association of Pulp Consumers

At the meeting of the Association of Pulp Consumers at the Waldorf-Astoria Hotel on Wednesday, February 18, the following officers and board of directors were elected: president, George R. Wallace, Fitchburg Paper Co., Fitchburg, Mass.; vice-president, Carlton W. Smith, Miamisburg Paper Co., Miamisburg, Ohio; secretary-treasurer, C. V. Maudlin, Mills Building, Washington, D. C.

Board of directors: N. H. Bergstrom, Bergstrom Paper Co., Neenah, Wis.; Austin E. Cofrin, Fort Howard Paper Co., Green Bay, Wis.; Douglas Crocker, Crocker Burbank & Co. Assn., Fitchburg, Mass.; Glenn E. Graham, Sutherland Paper Co., Kalamazoo, Mich.; Hugo H. Hanson, W. C. Hamilton & Sons, Miquon, Pa.; Dwight G. W. Hollister, A.P.W. Paper Co., Albany, N. Y.; W. Irving Osborne, Jr., Cornell Wood Products Co., Cornell, Wis.; James F. Ryland, Standard Paper Mfg. Co., Richmond, Va.; N. F. Greenway, Robert Gair Co., New York; Paul E. Hodgdon, Deerfield Glassine Co., Monroe Bridge, Mass.; Robert Richardson, Gardner-Richardson Co., Middletown, Ohio; and Dwight Stocker, Michigan Paper Co., Plainwell, Mich.

Sulphite Paper Mfs. Association

Fred W. Cole, sales manager, Fraser Industries, Inc., was elected general manager of the Sulphite Paper Manufacturers Association at the annual meeting held Monday, February 16, at the Hotel Waldorf-Astoria, New York. Elected as vice-chairman of the bleached group was John Stevens, Jr., vice-president, Marathon Paper Mills Company.

The following vice-chairmen were re-elected: Unbleached group, George Stuhr, Southern Kraft Division of International Paper Company; manila group, Rufus L. Sisson, Jr., vice-president and sales manager, Racquette River Paper Company; machine glazed group, Edgar W. Kiefer, president, Port Huron Sulphite & Paper Company.

The above officers, together with the following, make up the board of governors: John E. Alexander, president and general manager, Nekoosa Edwards Paper Company; Winfield E. McIntyre, Dexter Sulphite Pulp and Paper Company; Walter B. Merlin, vice-president, Hollingsworth & Whitney Company; Harold O. Nichols, eastern sales manager, Crown Zellerbach Corporation; Leroy F. Porter, vice-president in charge of sales, Northwest Paper Company; and Rufus I. Worrell, Mead Sales Company.

Glazed and Fancy Paper Association

Leo R. McDevitt, Blackstone Glazed Paper Co., was re-elected Monday, February 16, as president of the Glazed and Fancy Paper Association, at the group's annual meeting held at the Hotel Commodore, New York.

Vice-presidents, elected at the meeting, are: manufacturing division, John H. Hazen, Hazen Paper Company; merchandising division, Charles H. Hoffman, Hughes & Hoffman. The following are newly-elected members of the executive committee: Arthur R. Walsh, Walther & Company, Inc., and Ralph K. Lane, Bradner, Smith & Company, both for the manufacturing division; Samuel Lachman, Lachman-Novasel Paper Company, for the merchandising division, one-year term.

Arthur A. Thomas, executive director of the association, with headquarters at 902 Union Trust Building, Providence, R. I., reported a membership of thirty-one, which is four above the number reported at the 1941 convention.

Blotting Paper Association

In annual session Monday, February 16, at the Hotel Waldorf-Astoria, New York, the Blotting Paper Manufacturers Association elected the following officers: President, G. A. Carlton, vice-president of the Standard Paper Manufacturing Company; vice-president, Joseph Hallowell, secretary and general manager of the Wrenn Paper Co.; secretary-treasurer, Russell L. Winget, 122 East Forty-second street, New York. Mr. Carlton displaced Henry S. Mead, president and treasurer of the Wrenn Paper Company, and Mr. Hallowell filled the seat previously occupied by U. S. Bratton, Jr., of the Rochester Paper Company.

Soda Pulp Manufacturers Association

The five members of the executive committee of the Soda Pulp Manufacturers Association were re-elected Tuesday, February 17, at its meeting held at the Hotel Waldorf-Astoria, New York. The committee members are: Chairman, Eustis Paine, New York & Pennsylvania Company; vice-chairman, Amor Hollingsworth, Penobscot Chemical Fibre Company; secretary-treasurer, Rufus I. Worrell, Mead Sales Company; F. G. Robinson; Carl Nieswander, Columbian Paper Company.

Newsprint Manufacturers Association

The annual meeting of the Newsprint Manufacturers Association of the United States was held at the Waldorf-Astoria Hotel on Wednesday February 18, at which the following officers were elected: president, A. L. Hobson, St. Croix Paper Company; vice-president, J. D. Zellerbach, Crown Zellerbach Corporation.

Executive Committee Members—George D. Bearce, Maine Seaboard Paper Company; Samuel Pruyn, Finch Pruyn & Company; and John H. Smith, Hawley Pulp & Paper Company.

R. S. Kellogg was reelected treasurer and Louis W. Adams was elected secretary.

Glassine and Greaseproof Association

Robert F. Nelson, vice-president of the Glassine Paper Company, Wednesday, February 18, was elected chairman of the Glassine and Greaseproof Manufacturers Association, at the group's annual meeting held in the Hotel Waldorf-Astoria, New York. The following executive committee was also elected: Folke Becker, president, Rhinelander Paper Company; Olaf Hedstrom, president, Hartford City Paper Company; Paul E. Hodgdon, president, Deerfield Glassine Company; Harry B. Kuhns, vice-president, Nicolet Paper Corporation; Paul F. Moore, president, Westfield River Paper Company; John L. Riegel, president, Riegel Paper Corporation.

U. S. Pulp Producers Association

A well-attended annual meeting of the United States Pulp Producers Association was held Sunday, February 15, at the Hotel Waldorf-Astoria, New York. Executive Director Oliver M. Porter, 122 East Forty-second street, New York, reported that the group elected two new members of the board of governors: M. B. Houston, Rayonier, Incorporated, succeeded Clyde B. Morgan, Eastern Corporation, and U. M. Dickey, Soundview Pulp Company, now has the seat formerly held by W. A. Starr, Soundview Pulp Company.

Groundwood Paper Association

The annual meeting of the Groundwood Paper Manufacturers Association was held on Monday, February 16 at the Waldorf-Astoria Hotel, at which the following officers were elected: president, E. G. Murray, St. Regis Paper Company; Western vice-president, E. G. Bennett, Escanaba Paper Company; Eastern vice-president, Paul A. Mahoney, International Paper Company; vice-president and counsel, R. E. Canfield. Board of Governors—Aubry Crabtree, Frazer Paper, Ltd., and James Coy, Blandin Paper Company.

Kraft Paper Association

The Kraft Paper Association at its annual meeting held on Tuesday, February 17, reelected E. R. Gay as president and G. B. Gibson as vice-president. It also elected the following Executive Committee: J. E. Alexander, W. H. Anders, J. H. Cowhill, G. F. Henderson, W. J. Henry, J. H. Hinman, R. A. McDonald, C. R. McMillen, J. R. Miller, N. S. Stone.

I. B. Oseas was retained as counsel and Dernell Every as assistant secretary.

Norbert A. McKenna Addresses N.P.T.A.

The National Paper Trade Association of the United States held its Thirty-ninth annual convention at the Waldorf-Astoria Hotel, New York, February 16-19 inclusive. The attendance was large, with many exhibits on the eighth and ninth floors.

R. C. Kettles Jr. Elected President

At the annual meeting on Thursday morning the following officers were elected: president R. C. Kettles, Jr., Chas. F. Hubbs & Co., New York; vice-president in charge of Fine Paper Division, J. H. Brewer, Storrs & Bement Co., Boston, Mass.; vice-president in charge of Wrapping Paper Division, C. E. Roach, Capital City Paper Co., Springfield, Ill.; treasurer, C. W. Vernon, Vernon Bros. & Co., New York; executive secretary, A. H. Chamberlain, 220 East 42nd street, New York.

Norbert A. McKenna, Chief, Pulp and Paper Branch, War Production Board, was the guest speaker at the open meeting held in the grand ballroom on Monday afternoon. R. C. Kettles, Jr., Chairman, Distributors' Advisory Representatives, also addressed the meeting.

Other Speakers

On Tuesday, J. F. Straub, Chief, Distributors Unit, Pulp and Paper Branch, Office of Price Administration, spoke at meetings of the Fine and Wrapping Paper Divisions. E. W. Tinker, executive secretary, American Paper and Pulp Association, also addressed the meeting on Tuesday on the subject of "A Broad View of the Picture".

On Wednesday the speakers were Frank W. Howe, Chief, Wrapping Paper Section, Pulp and Paper Branch, War Production Board, and Martin D. Schwartz, Chief, Industrial Papers Section, Pulp and Paper Branch, Office of Price Administration.

Address of Norbert A. McKenna

I should first of all like to pay an unqualified tribute to your industry, your Association and to the committee which has helped us so much, to Perry Lesh, to Dick Kettles, to Arthur Chamberlain, Bob Ziegler, and to the members of the committee. I regret only that my contact with the members of the committee was not as numerous as it was with the men I have mentioned. They have done a superb job.

As a result of their initiative and their excellent work, this industry is now benefiting or will shortly from the standardization and simplification schedules and practices which are the first issued by the War Production Board. I should like to say that the thoroughness with which this job was done by Dick Kettles and Bob Ziegler and the committee merited the unqualified compliments of John Lord O'Brian, our counsel, and the Attorney-General. They said it was the most carefully prepared and thorough job that had been offered to the Attorney-General on a matter subject to scrutiny for its anti-trust implications. I should like to thank you again.

Their work has only begun. We have asked them to complete the task, to do the job the whole way, and I have asked them to do two more very important jobs which there is no need to go into in detail here.

Thanks to the efficiency in the production and the use of paper, we are going to have instead of the production of 1941, an annual rate of perhaps as much as 22 million tons of supply, including imports. Our waste paper collections are up probably 35 to 40%, to somewhere around a current rate of 5½ million tons, and more waste paper coming in every week.

I also shall not go into too much detail. I have two partners who are going to address you at two other meetings of this convention, Frank Howe, a member of your fraternity, who is going to discuss coarse paper and everything that has to do with it from the point of view of our branch of the War Production Board. Another partner, George Lee, is going to do the same job for fine paper, and Jim Ritchie is going to discuss priorities.

We believe, therefore, that there is a reasonable balance in the paper industry today. We all know there are actual surpluses in newsprint and in book paper. There has already been a conversion of newsprint capacity to the making of wrapping manilas and 9-point board. The book paper machines will go over into writing paper to ease the situation that exists there.

The seasonal ease presently obtaining in liner board, etc., is perhaps a little deceptive. We hope, and it is the counsel of the containers branch of the War Production Board, that purchasers of these liner and other materials for containers stagger over the entire year their total requirements for paper products, lest their requirements coincide with the seasonal peak for transportation.

In other words, the requirements for the fall, for packing food, not only for containers but also for wrapping papers, protective papers, shall be distributed monthly over the entire year so there won't be a huge peak of demand and production and a consequent maldistribution that may occur at that time.

I believe you can do a superb job and a better one than you are now doing, if you will, if you are as totally efficient as we think you are, but your very survival and your service to this community depends on your wisdom, your intelligence, your efficiency, your alertness and your flexibility. It can be done in several ways.

I shall start with a few of the ways of lesser importance and finish with the method which I believe is the most important. Let's take transportation. You know that there is too little rubber. I can't tell you whether there is enough for commercial use in truck tires. I doubt it very much. If there is enough for truck use, it means we are not making enough of the end products for war. Therefore, having confidence that we will make enough of the end products for war, I believe there will not be enough rubber to maintain our trucking fleets at their present status. In transportation, every car that you can save means lessening the load elsewhere, means postponing or perhaps avoiding the imposition of priorities on railroad transportation and priorities also on truck transportation. So never use less than a carload lot when you can order in a carload lot. Buy from the mill nearest you or nearest your customer. Do it now. Deliver by truck only when it can be loaded full and cover the shortest distances. Put governors on them.

It may slow down the deliveries, but will save rubber and thus insure deliveries. Keep your brakes adjusted. More rubber is burned out by metal bands than by good brake bands. Appoint one man in each one of your bases of operation to be responsible for the economy in the use of transportation and the machinery that goes to make transportation possible.

We are spending two billion a month for war. That is twenty-four billion a year. By the end of this year we will be spending sixty billion for war; and by 1943, in the first part of the second quarter we should be spending our peak of about seventy billion for war.

That means that we can produce this year the target set for us by the President. Believe me—and I speak with a full knowledge that it may be construed as an official utterance—we can, if American industry will mobilize the way we think it can, produce 60,000 planes this year and 125,000 planes next year. We can produce 45,000 tanks this year and 70,000 next year and 20,000 anti-aircraft guns this year against 60,000 next year. We can produce and launch 8,000,000 tons of shipping this year and we will produce and launch 12,000,000 tons of shipping next year. We can put five, ten, or fifteen, million men in the field as the military requirement indicates and when they are needed.

All that means a very serious dislocation of all our businesses, and yours, too, and should point up the necessity for seeing to it that every product you merchandise shall serve an essential end, because with all those men employed and all that demand for the end products of war, it is impossible, gentlemen, to serve other than essential needs. You must see it; you must be alert to it!

We are fighting not only for survival. To survive, ladies and gentlemen, means that America must rule the world. One cannot permit again a threat to our sovereignty, our safety, our future. When we win this war, as I believe we must, we shall be the world's all-powerful nation. Into every quarter of the globe must go our authority, must go our industry, must go our enterprise, must go our invention.

The Japanese in the Dutch East Indies are operating twice as far from their home bases as the Germans would, to either this continent or the South American continent. The Japs have done what the Germans could do in Iceland, Greenland, Newfoundland, Nova Scotia, Canada, and the New England States.

They can come up from the South the same way. Our confidence, I hope, in the British Navy and that all-mighty barrier to the eastward has been dashed by the success of the Germans in the past week.

The same thing can be done by the Japanese. They can come down from the Northwest as easily as the Germans can from the Northeast.

We are almost helpless now, but we need not be helpless if we are quick and alert and courageous.

Democracy is an expression of faith that we can do it, by facing the truth of our danger, converting of our every last effort to war, sharing the sacrifice with our fellows, voluntarily giving, that we may win.

American labor and industrial management have the historic opportunity in the meeting of the problems created by war for paper to evolve a pattern and a philosophy of self-management and a free way of industrial life which shall rout forever from this land the fear that in a war democracy must give up all its free institutions.

In this crisis, high-minded labor leadership and high-minded industrial management must build enduringly a philosophy of self-sacrifice and must work out and establish a technique based on freedom of enterprise, autonomy of labor and management and the sanctity of the American way which shall meet every war, economic and social need.

Address of E. W. Tinker

E. W. Tinker, executive secretary of the American Paper and Pulp Association spoke as follows:

Many more pleasant undertakings could be assigned than discussing, in even a broad way, the situation with which the pulp and paper industry is confronted at this time. Probably never before in the history of the industry have we been faced with more stresses and strains.

There is no executive in the industry, in as far as I know, who would not agree that whatever it takes to win this war the industry will give and give gladly. Accepting this assumption as aviomatic, we pass to the question whether, having met war requirements, the industry should operate under as normal conditions as the times will permit. To you, I presume this promise would be axiomatic as being in the public interest and in the interest of an all-out war effort.

I am sure that a look at the record and a review of the facts will indicate that the pulp and paper industry has recognized its obligations from the initiation of the national defense program. All it has asked has been fair consideration of the facts and programs based upon facts and not fantasies. One of the first moves upon the creation of the National Defense Advisory Commission was a proposed program looking to public conservation in the use of paper, based upon the assumption that critical shortages were in the offing. An analysis of the real situation, made in cooperation with the National Defense Advisory Commission, resulted in the temporary abandonment of this program. If it had not been abandoned it is a fair assumption that speculative consumer buying would have started long before it did. There has been current, for over a year and a half, strong speculation from month to month that scarcity of pulp would curtail industry operations. As yet this has not developed and there is every indication that while mal-distribution is real, actual shortages do not and will not exist for some time to come, if at all.

The industry has carefully inventoried its requirements for critical metals and chemicals. The facts are in the hands of the War Production Board and it is a fair conclusion that as the all-out war production program develops and hits home, we will get the same consideration on the basis of the essentiality of our products that other industries receive. You and I cannot expect more, but if it is a governmental policy that in the interests of winning the war and maintaining civilian morale, normal operations will be permitted in as far as they do not interfere with the war program, then we along with other industries must make our case as to where our products fit into the picture.

There should be no misconception on the part of paper merchants that this situation will not become very real to them. The allocation of chemicals, metals, rubber and other items essential to the operation of the primary and converter industries, is dependent upon the available supply beyond requirements for

war purposes. If there is a shortage, operations will necessarily have to be curtailed. If there is a sufficient supply to permit the industry to operate on the present basis, then no serious shortages of paper or paper products should develop.

There is a good deal of engineering skill and ingenuity in the paper and pulp industry. All of this skill and ingenuity will be called upon to keep machines running. This is as it should be. However, under the best of circumstances, the situation will be difficult. It is greatly to be hoped that these difficulties will not be augmented by suppositions that will encourage consumer hoarding or speculative buying. There is no doubt but that these two considerations have, during the recent past, been to a considerable degree responsible for some of the difficulties of the industry.

To illustrate some of the things that we may be faced with in the near future, let us take a particular kind of paper concerning which the average consumer becomes fearful of an acute shortage. The quick exhaustion of retail stocks shortly brings complaints to the Office of Price Administration, which controls retail rationing. The possibility exists that paper in certain instances may be rationed from the standpoint of retail sales in a similar fashion as suggested in the case of sugar. In case the War Production Board decides shortages in certain kinds of paper are due to production in other kinds, less essential to war needs and to essential civilian requirements, it is within their province and justifiably so, to prohibit non-essential usage in order to relieve the situation.

I think we may all well be proud of the cooperative attitude shown by all factors in the pulp and paper industry in the efforts of the Office of Price Administration to prevent spiralling trends. In as far as I know, no unit in the industry has taken undue advantage of the situation and certainly you and I would agree that to do so, under war conditions, would justify drastic regulatory moves on the part of the Office of Price Administration. There has been in evidence in that office a sincere desire to recognize uneconomic conditions that are found to exist, but, at the same time, every evidence that if individual units in an industry do not cooperate effective action will be taken.

When one reviews the action and reactions within a vast industry, such as the paper and pulp industry as the defense and now all-out war program developed, it gives encouragement to all-out support for our democratic structure. We are in a war and in our daily lives and our daily transactions, if we expect to continue our system of free enterprise, it is an individual responsibility to cooperate with our national leaders. The violation of price schedules is not cooperation. Hoarding on the part of the manufacturer, merchant or consumer, is not in the public interest. Let us, each one, do our part.

The American Paper and Pulp Association has been in active contact with all governmental agencies dealing with the paper and pulp industry in all its ramifications. Fine cooperative relationships have, I hope, been built up under the policies laid down by the Executive Committee of the Association, which dictated all-out support for the war program of the Government and a maximum degree of intelligent cooperation on the part of the industry. In return, in my opinion, the pulp and paper industry has received, at least up to this time, very reasonable consideration. However, this does not mean that the industry will not suffer, along with other industries, the terrific impact of the war production program. It is to be hoped that our products will be considered more essential than those of other industries which have been practically annihilated on the basis of their past operations, but, nevertheless, each one of you is bound to be affected in your every-day business transactions. This may come to a point that will eliminate production of certain kinds of paper; it may involve material shifting of grades; and has already involved certain changes in consumer buying habits. It is to be hoped that we will all accept these changes and adjustments as a national necessity and proceed in line with the spirit, as well as the letter, of our governmental requirements. It has been our conception that one of the major functions of an industry association, under conditions such as those now existing, should be to keep the industry informed. Lack of understanding of current conditions and trends is one of the most difficult obstacles to overcome in times of stress.

In conclusion, I would like to suggest to you, in your own interest, careful and constant perusal of your trade journals and your Association releases, and also for your own protection, you should adjust your policies and practices to conform to the necessities of the situation. Actual knowledge and knowledge of trends is more essential today than ever before and I know your own Association is making every effort to keep you informed.

Canada Fixes Pulpwood Prices

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, February 16, 1942—The Wartime Prices and Trade Board has now fixed the selling prices of pulpwood for domestic consumption everywhere in Canada except British Columbia and Alberta at highest corresponding prices between July 1 and December 1, 1941.

Pulpwood produced and sold for licensed export is not affected by the order.

The ruling covers spruce, balsam, jack pine and poplar pulpwood either in the form of cordwood or logs. Persons who did not sell such pulpwood in any part of Canada east of Alberta during the basic period will be permitted to add 15 per cent to the highest lawful price at which they sold pulpwood of the same kind and quality during the first six months of 1941.

All agreements or commitments made after November 30, 1941, for sale of pulpwood affected by the order must be submitted to the Timber Controller, A. S. Nicholson, for approval.

Finds For French Paper Co.

Federal Judge Fred M. Raymond has dismissed a bill of complaint demanding a receivership for the French Paper company, a 37-year-old organization in Niles, Mich. The plaintiff, Frances French of California, claimed the firm failed to show profits since 1931, and asked a dissolution of the business and a distribution of assets.

Judge Raymond ruled, in his opinion, that although the firm showed a profit but two years since 1931, its chief loss consisted of depreciation and held that conditions over which the management held no control were responsible for the lack of dividends, rather than poor management.

The plaintiff holds 415 shares of common stock in the concern.

Suggested Program for the Conservation Of Critical Materials

The following report was prepared by the OPM Committee for the Conservation of Critical Defense Materials, consisting of S. E. Kay, International Paper Company; R. W. Hovey, Oxford Paper Company, and H. H. Hanson, W. C. Hamilton & Sons, and was submitted to Mr. McKenna on December 31, 1941. E. W. Tinker, executive secretary of the American Paper and Pulp Association suggests "that copies of this report be put into the hands of persons in each mill best qualified by ability and position to undertake the supervision of a comprehensive plan of conservation that will accomplish results.

The WPB would like to be kept advised as to the progress being made in the furtherance of this program and I request that a report be made to the Association from time to time in regard to action, with full particulars as to any practices adopted that will be of value to other mills. Individual company action will be recorded and the industry's progress reported to WPB. It is hoped that voluntary action will avoid directives that might work hardships. This is a matter of the utmost importance and I feel sure that the industry will demonstrate its willingness to enter into this program on a cooperative rather than on a directed basis."

Additional copies of the enclosed report are available upon request at the office of the American Paper and Pulp Association, 122 East 42nd street, New York.

In accordance with a request made by the Office of Production Management, the Committee for the Conservation of Critical Defense Materials has conducted a spot survey of the Pulp, Paper and Paperboard Industry to determine the savings that can be made in the industry's usage of a specified list of critical materials and the means by which this saving can be accomplished.

As time did not permit a survey of the entire industry, questionnaires were submitted to a representative cross-section totalling 33 per cent of the Pulp, Paper and Paperboard Industry. The survey was limited to materials required for Repair, Replacement and Operating Supplies and did not include materials required for new construction or expansion.

In the opposite column is shown a list of scarce materials used in the Pulp and Paper Industry as prepared by the War Production Board. The relative scarcity of these items is indicated and the War Production Board asks the cooperation of the industry in making the utmost effort in the conservation of these materials. Most of the materials shown on this list have been studied by the Committee and this study indicates that substantial savings can be accomplished by a broad conservation program.

On pages three through nine, under each of the materials concernetl, are listed various substitutions and conservation practices and the over all weighted average per cent of savings indicated if such practices were uniformly adopted by the industry. The substitutions and conservation practices listed are not by any means a complete list of all that may be practical. It should be recognized that substitutions which may be practical for mills producing certain grades of paper or pulp may be entirely impractical for mills making paper or pulp of a different type. With these qualifications, however, the following list will serve to indicate where substitution, prohibition and conservation may take place pending the preparation of a more complete list.

While iron and steel are among the materials included on the OPM's list of metals requiring conservation, it is believed impractical in most cases to accomplish any savings in these materials. This is, of course, due to the fact that iron and steel represent some of the principal materials that can be substituted for various equipment made of copper, aluminum, Monel, nickel, etc. In other words, the conservation of these and similar critical metals was necessarily accomplished only by an increased use of iron and steel. This increased use of steel, however, is insignificant compared with the considerable saving in more critical metals.

The general practices which may be followed to conserve scarce metals are: increased life of existing equipment by more careful operation, welding, more extensive repairs or increased use of salvage.

LIST OF SCARCE MATERIALS USED IN PULP AND PAPER INDUSTRY

Identification Numbers	Relative Order of Scarcity	
1	2	Aluminum
2	3	Cadmium
3	2	Chromium
4	3	Copper
5	5	Lead
6	3	Nickel
7	7	Pig Iron
8	1	Steel-Plate
9	4	Steel-Seamless Tubing
10	5	Steel-Structural Shapes, Angles
11	4	Steel-Roller Bearing & Ball Bearings
12	3	Steel-Reinforcing rods
13	6	Steel-Castings and Forgings
14	2	Tin
15	3	Tool Steel
16	5	Zinc
17	5	Babbitt
18	3	Brass
19	3	Bronze
20	1	Monel
21	5	Solder
22	2	Stainless Steel
23	3	Fourdrinier Wire
24	8	Carbon Tetrachloride
25	3	Copper Sulphate
26	9	Ethyl Acetate
27	8	Milk Casein
28	7	Formaldehyde
29	8	Glycerine
30	8	Sodium Carbonate
31	9	Sodium Hydroxide
32	7	Sodium Pentachlorophenate such as Dowicide, NALCO Santobrite
33	7	Sodium Sulphite
34	9	Sodium Silicate
35	7	Titanium Dioxide
36	7	Glue
37	7	Gelatine
38	4	Chrome Brick
39	9	Plastics
40	3	Rubber
41	9	Shellac
42	8	Wool
43	7	Zinc Pigments
44	5	Litharge

In the case of chemicals, the general practices are: more careful routine inspections and supervision of existing usages aimed at minimizing usages and losses, and reduction in usage by altering amounts now used as standard.

Specific Recommended Substitution and Conservation Practices
Copper and Copper-Base Alloys

ITEM "A"—BRASS AND BRONZE CASTINGS
(Possible Savings indicated by Survey—22%)

1. Extend life of cast screen plates by rolling and recutting, chrome plating, or wearing slots to wider apertures than present standards. Rolling and recutting should approximately double the life of plates.

2. Substitution of cast iron, malleable iron or steel in all services except those exempted by Copper Order M-9-c because of chemical process service in acid pulping processes.
For Example:

Eliminate brass and bronze used in:

a. Pipe and pipefittings—substituting above materials (2) or wood, woodlined, asbestos-cement products, cement-lined steel, ceramics, glass or lead.

b. Pump runners and parts not essential to the functional performance of the unit.

c. Equipment parts where copper or its alloys are not essential for the functional performance of the unit—i.e.

1. Screen frames on coarse knotter and fine rotary screens,
2. Chest agitator castings, and shaft sleeves,
3. Tank inserts,
4. Bearing housing or brackets,
5. Doctor and roll supports,
6. All ornamental trim such as handwheels, roll journal caps, etc.
7. Sulphite digester blow pipes on downstream side of blow valve, substituting heavy cast iron pipe with test holes,
8. Target plates in sulphite blowpits substituting cast iron or wood.

ITEM "B"—FABRICATED COPPER, BRASS AND BRONZE INCLUDING PLATES, BARS, RODS, DRAWN AND EXTRUDED SHAPES AND PIPE
(Possible Savings indicated by Survey—32%)

To CONSERVE these materials and reduce to practical minimum the copper and copper alloys used in the following services, substituting steel, wood, wrought iron, lead, plastics, fiberboard, laminated wood:

1. Lining, sheathing, guards, splash boards, flashing, drains, casings, baffles, gaskets, expansion joints, battens, saveall pans and splash pans on paper machines.

2. Perforated plates used on screens by patching damaged screen plates and by wearing screen holes to larger size than present standard before replacing.

3. Fabricated bolts of all sizes where steel or other less scarce materials may be substituted without its rapid destruction by the presence of active corrosive agents. Example, use steel bolts for suction box and table roll rail supports on fourdrinier machines and lead sheathed or copper plated steel as a substitute.

To prohibit the use of materials of this type using substitutes for:

1. The pipe systems of pulp, paper and paperboard mills for conveying stock, white water, fresh water, condensate gases, clay, starch, size, color, dyes, etc., or for cold acid solutions except in sizes under ½ inch diameter. These alloys are to be used only in the acid process for conveying fluids with temperatures above 212° F. and above atmospheric pressure. Substitutes may be wrought iron, galvanized iron, wood, wood-lined, asbestos-cement products, cement-lined, ceramics, glass or lead.

2. Heat exchanger equipment: use steel tubing or galvanized iron in heaters and economizers.

3. Storage tanks, flumes and sluices: use steel, ceramic linings and wood.

4. Hoppers, saveall pits, headboxes, fabricated structures.

5. Jordan and beatertackle: use steel.

6. Perforated rotary knotter plates: use steel.

7. All trim and ornamental parts.

ITEM "C"—MISCELLANEOUS BRASS AND BRONZE FINDINGS
(Screens, Nuts, Bolts, Valves and Pipe Fittings)
(Possible Savings indicated by Survey—25%)

1. Substitute ferrous metals or combinations of ferrous metals and low copper bearing steels in screws, nuts, bolts and nails. This practice may be carried out in all usages where active chemical corrosive action is not present.

2. Substitute plated iron or steel—i.e. galvanized iron, copper plated, chrome plated and special paints.

3. Substitute cast iron, malleable iron or steel in all valves and pipe fittings except those exempted by Copper Order M-9-c because of chemical conditions in pulping processes and tubing under ½ inch diameter.

ITEM "D"—OTHER COPPER
(Possible Savings indicated by Survey—8%)

1. Substitute ferrous busbar clamp.

2. Conserve life of electrical equipment such as motors and generators by reinsulating coils rather than purchase of new coils—i.e. establish local electrical repair shop to salvage coils.

3. Establish a more intense system of inspection to prolong life of motors and generators—i.e. frequent check of gaps between rotors and stators to avoid "burnouts", also a routine cleanup program as well as more adequate protection against overload.

4. Substitute used copper cable for busbars.

ITEM "E"—WOVEN WIRES (*There is no available substitute for woven brass and bronze wires* as used by the pulp, paper and paperboard industry.)
(Possible Savings indicated by Survey—3%)

1. Conserve by using salvaged fourdrinier wires for cylinders.

2. Conserve wire life by improved mechanical condition of fourdrinier and cylinder machines.

ITEM "F"—ELECTRIC WIRING
(Possible Savings indicated by Survey—12%

1. Conserve on use of this material by deferring electric wiring improvement and replacement programs—e.g., carrying heavier loads on existing equipment.

2. *There is no substitute for copper used for conducting electricity* except the more scarce material, aluminum.

Aluminum

(Possible Savings indicated by Survey—35%)

1. Substitute steel for aluminum angles for doctors.

2. Replace aluminum white water trays with resin-bonded plywood.

Chromium and Nickel

(Possible Savings indicated by Survey for Chromium —21%, Nickel—19%)

1. Substitute lead pipe in sulphite mills where temperature and pressure will permit.
2. Conserve life of acid-resisting bronze fittings by brazing where possible.
3. Prohibit use of all decorative trim.

Monel

(Possible Savings indicated by Survey—22%)

1. Substitute wooden white water trays for Monel.

Lead

(Possible Savings indicated by Survey—17%)

1. Substitute ceramic pipe.
2. Substitute ceramic linings.
3. Substitute spray towers for defective lead SO_2 gas coolers where replacement is necessary.
4. Savings originating from economies reported under copper and copper-base alloys.

Tin

(Possible Savings indicated by Survey—15%)

1. Conserve tin through increase use of salvaged babbitt.
2. Plastic painting of beater bars in place of tin plating.
3. Savings originating from economies reported under copper and copper-base alloys.

Zinc

(Possible Savings indicated by Survey—24%)

1. Substitute asbestos corrugated sheeting or wood in place of galvanized sheets.
2. Substitute plastic paints for galvanizing.
3. Savings originating from economies reported under copper and copper-base alloys.

Sodium Hydroxide

(Possible Savings indicated by Survey—9%)

1. In the case of mills making part of their sodium hydroxide, small increases in production may be accomplished by operating electrolytic cell plants with minimum outage and at maximum continuous capacity. This will relieve the necessity of outside purchases of sodium hydroxide and will increase chlorine production.

2. More careful supervision of chemical recovery operations aimed at minimizing losses from leaks, spillovers, and losses at various steps in the process. This would require frequent tests and measurements including a continuous log of the location and magnitude of the existing losses.

3. Modifications in process hook-up aimed at reducing known present losses. Better washing equipment. Consideration should be given to Cottrell electric precipitators and flue-gas scrubbing equipment.

4. Substitution of other alkalies less important to National Defense in nonpulping processes—i.e., calcium base for pH control, and chloramine manufacture.

5. Prohibition of use of sodium hydroxide for all uses except those essential for pulping, papermaking, and sizing operations.

Sodium Carbonate

(Possible Savings indicated by Survey—14%)

1. More careful supervision of chemical recovery operations aimed at minimizing losses from leaks, spillovers, and losses at various steps in the process. This would require frequent tests and measurements, including a continuous log of the location and magnitude of the existing losses.

2. Modifications in process hook-up aimed at reducing known present losses. Better washing equipment. Consideration should be given to Cottrell Electric precipitators and flue-gas scrubbing equipment.

3. Substitution of other alkalies less important to National Defense or other practices to perform the same or equivalent service, i.e., calcium base for cleaning purposes, more extensive use of wiping and washing methods.

4. Prohibition of use of sodium carbonate in all uses except those in which it takes a chemical part in the actual manufacture of pulp or paper. Exception to this prohibiting: sodium carbonate used in boiler feedwater treatment.

Carbon Tetrachloride

(Possible Savings indicated by Survey—21%)

1. Substitution by the use of commercial materials lower in carbon tetrachloride content such as "Safety-Clean" or the compounding or similar fluids locally using carbon tetrachloride base.

2. Substitution of carbondioxide or "Foamite" types of fire extinguishers on all new or replacement units.

3. Substitution of other less critical cleaning fluids such as "Oakite" and others.

4. Substitution of kerosene or gasoline by providing suitable safety provisions for their use.

5. Prohibition of all uses of carbon tetrachloride except where no adequate substitute is available.

Titanium Dioxide

(Possible Savings indicated by Survey—34%)

1. Conservation by improved recovery processes on paper machine systems.

2. Conservation by reductions in amounts used in various grades of paper and paperboard liners manufactured and still retaining part of the desired characteristics.

3. Substitution of other less critical pigments such as calcium carbonate, calcium sulphite, calcium sulphate, especially treated if necessary.

4. Substitution by using colored dyes or pigments to impart opacity properties, particularly in lightweight papers.

5. Prohibition of its use in all papers except where no adequate substitute is available.

Formaldehyde

(Possible Savings indicated by Survey—23%)

1. Conservation of usages by reduction in amount used even though the present paper standards may require slight revisions.

2. Substitution of satin white in coating formulas or cutting casein with ammonia to render it nonwater soluble thus permitting the elimination of Formaldehyde.

3. Substitution of other organic materials which are less critical to National Defense, provided they may be developed for commercial use—i.e., tetrahydroxydioxane.

4. Prohibition of use of formaldehyde except where no adequate substitute is available.

Copper Sulphate

(Possible Savings indicated by Survey—17%)

1. Conservation by the reduction in amounts used by more careful control aimed at maintaining the minimum usage consistent with requirements.
2. Substitution of suitable coagulation and filtration systems in water treatment.
3. Prohibition of use of copper sulphate except where no adequate substitute is available.

Ethyl Acetate

(Possible Savings indicated by Survey—16%)

1. Prohibition of use of ethyl acetate except where no adequate substitute is available.

Borax

(Possible Savings indicated by Survey—21%)

It is understood that Borax is now available. If such is the case these recommendations should be disregarded.

1. Conservation by the reduction in amounts used by more careful control aimed at maintaining minimum usage consistent with use requirements after due consideration to practical reduction in paper standards.
2. Substitution of ammonia, disodium phosphate, or trisodium phosphate.
3. Prohibition of use of borax except were no adequate substitute is available.

Sodium Sulphite

(Possible Savings indicated by Survey—23%)

1. Conservation by improved control of usage aimed at reducing amounts actually used taking into consideration the reduction of present standards.
2. Prohibition of use of sodium sulphite except where no adequate substitute is available.

Sodium Silicate

(Possible Savings indicated by Survey—25%)

1. Conservation by improved control of usage, change design of application and modification of standards in use.
2. Substitution of glues and starches.

Zinc Pigments

(Possible Savings indicated by Survey—20%)

1. Substitution of calcium carbonate, barium sulphate, calcium sulphite, calcium sulphate, chalk.
2. Substitution of dyes or colored pigments where zinc pigments are used for opacity.
3. Prohibition of use of zinc pigments except where no adequate substitute is available.

Casein

(Possible Savings indicated by Survey—11%)

1. Conservation by modifying existing standards, more careful control of processing operations and the blending with soya bean or corn protein with casein.
2. Substitution of starch, soya bean protein or corn protein.

Cork

(Possible Savings indicated by Survey—32%)

1. Substitution of fiber or mineral insulation.
2. Substitute asbestos, plywood or pulp sheets for gasket materials.
3. Substitute fiber or asphalt-base materials for vibration insulation.
4. Prohibition of use of cork except where no adequate substitute is available.

Rubber

(Possible Savings indicated by Survey—15%)

1. Substitute leather or cotton impregnated with asphalt or phenolic resin compounds for rubber belting.
2. Substitute sulphite pulp sheets, phenolic resin sheets or asbestos for packing and gaskets.
3. Retread automobile tires before worn out.
4. Provide improved storage and supervise use of rubber boots.
5. Give more careful supervision and attention to maintenance of mechanical condition of rubber rolls as a means of prolonging their life.

Linweave Association Meets

The Linweave Association reelected Hugh G. Boyer, of the Caskie Paper Company, Charlotte, N. C., as President at the annual meeting of the Association held at the Waldorf-Astoria Hotel, New York City on February 14th. Other Linweave officers and committees elected were: Victor E. Hecht, of Zellerbach Paper Company, San Francisco, Vice-President; Phil Richardson of Storrs & Bement Company, Boston, Secretary; William Stetson of Storrs & Bement Company, Boston, Josef Buerger of Alling & Cory Company, Pittsburgh, and Noble Gillette of Chicago Paper Company, Chicago, members of the Executive Committee.

Resignation of Keith S. Campbell as Chairman of the Linweave merchants' advertising committee was announced. Mr. Campbell has enlisted in the U. S. Army. The new advertising committee consists of James Bligh, Barton, Duer & Koch Paper Company, Washington, John Williams, D. L. Ward Company, Philadelphia and M. P. Alogna, Storrs & Bement Company, Hartford, Conn.

Following the business meeting of the Association the merchant members were entertained at luncheon by P. P. Kellogg & Co. Division, U. S. Envelope Company, after which the merchandising and promotion plans for 1942, as developed by the company in cooperation with the association's merchandising and advertising committees, were presented by Linweave Manager T. H. Chambers. General Manager E. V. Johnson of the U. S. Envelope Company and E. L. Wight, Advertising Manager were other speakers on the program.

Manager Chambers in announcing a 30% increase in sales of Linweave lines in 1941 over 1940 presented to L. A. Ramaker, president of Bouer Paper Company, Milwaukee, the trophy for greatest percentage of sales increase in 1941. Second in percentage of sales increase was Barton, Duer & Koch Paper Company of Baltimore and third Zellerbach Paper Company of San Francisco.

The role of quality book papers in war time and the new responsibilities of merchant, mill and printer were announced as the subjects of a direct mail campaign, the first two pieces of which were presented at the meeting.

The day's activities concluded with a dinner and entertainment in private dining room at Toots Shor's Restaurant, New York City.

AS THE COIL of the first Atlantic cable stretched its history-making course through the depths of the ocean between America and Europe, it became not only a physical bond between the continents, but a symbol, as well, of unprecedented progress to benefit the trade of the world. That the Atlantic cable achieved this in the cause of commerce is now living history.

UNITY...HALL-MARK OF GREATNESS IN ENTERPRISE

"AWAITING THE REPLY." PAINTING BY ROBERT DUDLEY. REPRODUCED BY COURTESY OF THE METROPOLITAN MUSEUM OF ART

Similarly, to broaden the scope of their endeavors with benefit to those they serve, the Niagara Alkali Company and the Electro Bleaching Gas Company have united the strong strands of their enterprises to become one...the Niagara Alkali Company. The quality reputation of all products...the fine traditions of management...will continue to distinguish this greater American business in the field of chemicals.

Niagara
ALKALI COMPANY
60 EAST 42nd STREET, NEW YORK, N. Y.

CAUSTIC POTASH · CAUSTIC SODA
PARA · CARBONATE OF POTASH
Liquid Chlorine

EBG NIAGARA ALKALI COMPANY

Technical Men Hold 27th Annual Meeting

R. A. Hayward, President of Kalamazoo Vegetable Parchment Co., Is Chosen President—Sir Herbert Gepp Mng. Dir. of Australian Paper Mills Speaks At Luncheon—R. B. Wolf Gets TAPPI Medal.

Ralph A. Hayward, president of the Kalamazoo Vegetable Parchment Company, Kalamazoo, Mich., was elected president at the twenty-seventh annual meeting of the Technical Association of the Pulp and Paper Industry at the Hotel Commodore, New York, February 16 to 19 inclusive. Vance P. Edwardes was elected vice president and the following were elected to serve for three years on the executive committee:—Worthen E. Brawn, general superintendent, Pejepscot Paper Company, Brunswick, Me.; Orvon P. Gephart, superintendent, Miamisburg Paper Company, Miamisburg, Ohio; Charles R. Seaborne, vice president and treasurer, Thilmany Pulp and Paper Company, Kaukauna, Wis.; R. S. Wertheimer, vice president and resident manager, Longview Fibre Company, Longview, Wash. R. G. Macdonald continues as secretary-treasurer.

All the meetings were well attended and many excellent papers on timely topics of interest to the technical men of the pulp and paper industry were presented. The luncheon in the ball room of the Hotel Commodore at 1:00 P.M., Thursday was especially well attended. The features of the luncheon were a splendid address by Sir Herbert Gepp, managing director, Australian Paper Mills, Melbourne, Victoria, Australia, and the presentation by Ralph A. Hayward of the TAPPI medal for outstanding contributions to the technical progress of the industry to Robert Bunsen Wolf, manager, Pulp Division, Weyerhaeuser Timber Company, Longview, Wash.

R. G. MACDONALD
Secretary-Treasurer

President's Address

W. H. Swanson, president of the Association, delivered his address at the opening session of the convention on Monday morning as follows:—

A review of the association activities over the year just passed shows that they have followed quite a normal course. This in spite of the very hectic condition which has developed within the industry and in the nation generally over the same period of time, because of the defense and war efforts.

The association's membership, contrary to expectations, has not suffered during the period. Financially, also, no adverse trends have developed. The association is still in a satisfactory state in this respect.

Sectional activities have been maintained in a healthy state the country overall. During the year a new group came into being in Maine and New Hamp-

R. A. HAYWARD
President

V. P. EDWARDES
Vice President

shire, made up of technical people from that area. It is hoped that this will develop into a new section.

The publication phase of the association's business has proceeded smoothly. In one feature a change was made, namely, as regards literature abstracts. These will now be issued as a separate publication. This replaces the former practice of publishing them at intervals in the PAPER TRADE JOURNAL, which has proven to be impractical.

Divisional and committee activities have not shown any degradation in quality. It was found desirable to rearrange the structure of the Testing Division to correct some apparent faults in its set-up. This has been done.

The Fundamental Research committee has fostered the institution of a research fellowship project to be supported by the association. This has been approved by the executive committee and will be duly publicized.

The fall meeting of the association held at Ann Arbor, Mich., in September proved an inspiration to all those who attended. It was outstanding in educational character and of unusual value since speakers from several branches of the Government with a clear viewpoint on defense activities and problems were provided as a part of the program. This proved of great interest to the technical men of the industry since it is rare that they have an opportunity at first hand to obtain this viewpoint on the national picture. Mr. Hayward and his assistants from the Kalamazoo Section and the University of Michigan deserve the greatest praise of the association and its thanks for their efforts.

So much for the situation last year. What is the outlook for the future? Any attempt to answer this question at the present time is foolhardy. Our nation is now at war, and its nature is such that we must play it for "keeps." As we all see it there can be no compromise as to its outcome. We must and will win, and I hope in the act of winning demonstrate for all time that the possession of power by one nation or one group of nations does not justify the assumption that it or they possess a superior intelligence and are therefore destined to determine the future outlook for the whole world.

It is obvious to all of us, now, that there is immediately ahead of us only one job and that is the winning of the war. Each and every one of us, in the way which we as individuals can best do so, must bend all our efforts in that direction. So, also, must our association and our industry constantly keep abreast of the needs of our country, which we can supply and adjust our policies continuously so as best meet these needs.

Report of the Secretary-Treasurer

R. G. Macdonald, the secretary-treasurer of the association delivered his annual address as follows:

The Technical Association in 1941 enjoyed a prosperous year although its membership was affected by the loss of many members residing in Europe.

MEMBERSHIP

There were 217 individual members elected in 1941. One hundred and forty-four members resigned or were dropped from the membership roster. On December 31, 1941, the total individual membership was 1867.

There were 12 Corporate and 7 Sustaining members elected. Two Corporate and 2 Sustaining members resigned or were dropped. The corporate membership on December 31, 1941, was 87 and the sustaining membership was 91.

The following companies became Corporate Members in 1941:

Ecusta Paper Company, Brevard, N. C.
Berst-Forster-Dixfield, Plattsburg, N. Y.
Sutherland Paper Company, Kalamazoo, Mich.
Sonoco Products Company, Hartsville, S. C.
Cornell Wood Products Company, Cornell, Wis.
Rayonier, Inc., Shelton, Wash.
Gulf States Paper Corporation, Tuscaloosa, Ala.
Rolland Paper Company, Montreal, Que.
Cia de Celulosa de Filipinas, Manila, P. I.
Castanea Paper Company, Lock Haven, Pa.
Cellulose Development Company, London, England.
The Upper India Couper Paper Mills Company, Lucknow, India.

The following companies have become Corporate Members for 1942:

St. Mary's Kraft Company, St. Mary's, Ga.
Thilmany Pulp and Paper Company, Kaukauna, Wis.
Keyes Fibre Company, Waterville, Me.
Container Corporation of America, Chicago, Ill.
W. R. Grace & Co., New York, N. Y.
Peter J. Schweitzer, Inc., Elizabeth, N. J.

The following companies became Sustaining Members in 1941:

Michigan Alkali Company, Wyandotte, Mich.
D. J. Murray Manufacturing Company, Wausau, Wis.
Combustion Engineering Company, New York, N. Y.
Pusey & Jones Corporation, Wilmington, Del.
Asten-Hill Manufacturing Company, Philadelphia, Pa.
Heppenstall Company, Pittsburgh, Pa.
Harry R. Lewis Company, Warren, Pa.

The following companies have become Sustaining Members for 1942:

Anheuser-Busch, Inc., St. Louis, Mo.
The Dicalite Company, New York, N. Y.
Valley Iron Works Co., Appleton, Wis.
Quigley Company, New York, N. Y.

NECROLOGY

The association lost through death the following members:

A. A. Bush	W. S. Hodges
R. A. Colby	W. J. Lawrence
Eugene L. Connolly	A. A. Macdiarmid
C. J. Enemark	G. A. Macklem
H. R. Harrigan	P. Sandwell
C. C. Hockley	Albert F. Williams

Although not a member, the loss of Frank C. Overton as a member of the Certified Pulp Testers Bureau is felt. Mr. Overton devoted considerable time and interest to the joint effort of the A.P.P.A., A.A.W.P.I., and TAPPI to the establishment of rules and ethics concerning the commercial testing of wood pulp.

SPECIAL REPORTS ON MANUFACTURING PROBLEMS

Throughout the year the secretary's office handles a large correspondence dealing with technical and other types of inquiries concerning details of the pulp, paper and paperboard manufacturing operations. An effort is made to obtain reliable information for all inquirers through the files of the central office, committee chairmen, and specially qualified individuals. In many cases the value of the re-

sponse depends on the compilation of the experience records of a large number of individuals and companies. These compilations are sent to the company members of the Association and to individuals who have cooperated through furnishing information. These compilations are called Special Reports on Manufacturing Problems. In 1941 the following reports were issued:

Special Report 313—Use of Microscopy in Paper Mills
Special Report 314—Drying Rates of Pulp
Special Report 315—Color Matching Aptitude
Special Report 316—Effect of Acidity on Paper Used by Converters
Special Report 317—Groundwood Pulping Control
Special Report 318—History and Achievements of the Technical Association of the Pulp and Paper Industry
Special Report 319—Industrial Relations — Today and Tomorrow
Special Report 320—Operating Control of Pulp Bleaching

Employment

During the past several years the Association has acted as a medium to help its members find satisfactory employment. Several hundred members and others have benefited by this service and pulp, paper, and paperboard companies are urged to utilize the Association's facilities for obtaining competent superintendents, chemists, engineers, and mill executives. At the present time there is relatively little unemployment in the Association membership.

Fall Convention

The fall meeting of the Association was held at Ann Arbor, Michigan, on September 16-19, 1941 with the Michigan Union as headquarters. There was an attendance of about 550. A detailed report appeared in the trade papers of the industry immediately following the convention. An unusual and timely program was arranged under the general chairmanship of Ralph A. Hayward of the Kalamazoo Vegetable Parchment Company, assisted by W. Kent Kidder of the Bryant Paper Company, and Donald W. McCready of the University of Michigan.

The 1942 fall meeting will probably be held at Boston, Massachusetts, late in September.

Research Promotion

Only one project was financed by an official grant of the association. This was Project 20 to the Materials of Construction Committee—$800—to conduct an investigation of packings problems in the sulphate pulp mills and to make a survey of the experience of sulphate pulp mills with materials used for process piping and tubing. The work was done under the direction of James A. Lee, chairman, and J. W. Hemphill and S. B. Jones, Subcommittee Chairmen.

Publications

Each member received the following publications which are issued annually: Bibliography of Papermaking and U. S. Patents (April); Technical Association Papers (752 pages) (July); TAPPI Year Book (October); TAPPI Standards (additional sheets), and the Paper Trade Journal (weekly). A new publication TAPPI Papermaking Abstracts (150 pages) was issued in December. As soon as the abstracts are brought up to date they will be published in a quarterly together with other information of value to members.

In November, the Association issued a 71-page book on the Bleaching of Sulphate Pulp by F. Loeschbrandt (translated by Miss E. Martin of the Solvay Process Company).

Although prepared in 1941 the first monograph to be issued by the Association will appear in 1942. This is on Industrial Water for the Pulp, Paper and Paperboard Industry (prepared under the direction of the TAPPI Water Committee).

Included in the TAPPI Fall Meeting issue of the Paper Trade Journal was a 64-page insert, prepared by the Secretary of TAPPI, outlining the History and the Achievements of the Technical Association. This report commemorated the 25th anniversary of the Association and the 20th year of use of the Paper Trade Journal as a publishing medium for technical papers and other purposes. Separate reprints of this history may be obtained from the Association on request.

The Lockwood Trade Journal Company contributed financially to the publication of Technical Association Papers. In preparing this publication and the articles that have appeared weekly in the Paper Trade Journal, the Association is indebted to the editor, Henry J. Berger, for his whole-hearted assistance and to George S. Macdonald for his sympathetic cooperation.

C. J. West and his Committee on Abstracts and Bibliography again made a worthy contribution to the industry in preparing the Bibliography of Papermaking and the TAPPI Papermaking Abstracts.

Local Sections

No new local sections were organized in 1941. The Maine-New Hampshire Group held its second meeting at Orono, Maine in the fall. An informal group of TAPPI members and others have held several meetings at Los Angeles, California, under the designation of the Papermakers and Associates of Southern California. H. L. Joachim, a member of TAPPI, is chairman of this organization. The New England, Empire State, Delaware Valley, Ohio, Kalamazoo Valley, Lake States, and Pacific Sections held well-attended and interesting meetings at frequent intervals during the year and the Kalamazoo Valley Section was host to the Association at its Fall Meeting held at Ann Arbor, Michigan.

National Defense

Although the Technical Association, as an organization has not been called upon to work directly with the government agencies such as the OPM and the OPA, it has cooperated with the American Paper and Pulp Association and other associations. Members of the staff have assisted the special committees in their work dealing with priorities and individual members of the association have devoted considerable time to special committee work. The association has conducted a survey on chip packers and its Optical Properties Committee has assisted the Office of Production Management in preparing two suggested methods, one on the brightness of paper and one on the brightness of plup. These methods have been of assistance in measuring this property whose ceiling or maximum has been designated by the OPM.

Divisions and Committees

The members of the association have been ex-

tremely busy during the past year on company matters and have found it difficult to devote much time to committee activities. The organization of the committees, however, has been beneficial to the association through improvements in personnel who have taken a greater interest in the work of the organization. The actual accomplishments of these committees is reflected in its meeting programs, publications, and in the standards and suggested methods that have been developed. The following part of this report is limited merely to the personnel and changes that have taken place in the leadership of the committees and divisions during the past year.

ENGINEERING DIVISION, W. G. MACNOUGHTON, NEWS PRINT SERVICE BUREAU, GENERAL CHAIRMAN. There were no changes in the chairmanship of any of the committees or subcommittees of this division. The following chairmen served in 1941: *Heat and Power Committee*—Roderick O'Donoghue, Consulting Engineer, Chairman; *Drying, Heating, and Ventilating Subcommittee*—A. E. Montgomery, J. O. Ross Engineering Company, Chairman; *Heat Utilization in Chemical Processes Subcommittee*—J. W. Ogden, Foster-Wheeler Company, Chairman; *Production and Transmission of Power Subcommittee*—E. F. Burns, International Paper Company, Chairman; *Materials of Construction Committee*—J. A. Lee, Chemical and Metallurgical Engineering, Chairman; *Packing Materials Subcommittee*—J. W. Hemphill, Johns-Manville Company, Chairman; *Piping and Tubing Materials Subcommittee*—S. B. Jones, West Virginia Pulp and Paper Company, Chairman; *Water Committee*—L. B. Miller, Keasbey & Mattison Company, Chairman; *White Water Committee*—C. M. Baker, Consulting Engineer, Chairman.

The Materials of Construction Committee and its subcommittees conducted an extensive survey of the use of piping and packing materials in the kraft pulp and paper mills. The results will be reported in 1942. V. F. Waters, Technical Assistant to the Secretary, devoted a considerable amount of time in the field obtaining the information needed in this investigation.

The Water Committee completed its work on the preparation of the first TAPPI Monograph on Industrial Water for the Pulp and Paper Industry. This was issued to the members early in 1942.

The Production and Transmission of Power Subcommittee conducted a survey on fuels used in the paper industry.

INDUSTRIAL DIVISION—H. H. HANSON, W. C. HAMILTON & SONS, GENERAL CHAIRMAN. There were two changes made in this division; J. R. Atwater, Dill & Collins, Inc., succeeded L. T. Stevenson as chairman of the *Industrial Engineering Committee*. W. L. Cassiday, Michigan Board of Vocational Education was appointed chairman of the new *Vocational Training Committee*. John Traquair, Mead Corporation, and E. N. Poor, W. C. Hamilton & Sons, continued as chairmen of the *Fibrous Raw Materials Committee* and the *Nonfibrous Raw Materials Committee*, respectively.

CONVERTING AND CONSUMING DIVISION—A. W. NICKERSON, CONSULTING ENGINEER, GENERAL CHAIRMAN. J. D. Davis, Dill & Collins, Inc., succeeded F. W. Egan of the John Waldron Corporation as chairman of the *Coating Committee*. J. D. Malcolmson, Robert Gair Company and M. S. Kantrowitz, Government Printing Office continued as chairman of the *Container* and the *Graphic Arts Committees*, respectively.

RESEARCH DEVELOPMENT DIVISION—D. W. MCCREEDY, UNIVERSITY OF MICHIGAN, GENERAL CHAIRMAN. R. P. Whitney, Massachusetts Institute of Technology was appointed chairman of the newly organized *Engineering Research Committee*. C. J. West and H. F. Lewis, Institute of Paper Chemistry, Allen Abrams, Marathon Paper Mills, and C. W. Rivise, Caesar & Rivise, continued as chairmen of the *Abstracts and Bibliography Committee, Fundamental Research Committee, Bacterial Control Committee*, and the *Patents Committee*, respectively.

PULP MANUFACTURE DIVISION—S. D. WELLS, INSTITUTE OF PAPER CHEMISTRY, GENERAL CHAIRMAN. R. F. Huntley, Sealright Co., Inc., succeeded Lyman Beeman, St. Regis Paper Company as chairman of the *Mechanical Pulping Committee*. H. A. DuBois, Kimberly-Clark Corporation, Paul Hodges, Crossett Paper Mills and D. T. Jackson, Hammermill Paper Company, continued as chairmen of the *Acid Pulping Committee, Alkaline Pulping Committee*, and the *Pulp Purification Committee*, respectively.

PAPER MANUFACTURE DIVISION—G. LAMONT BIDWELL, JR., RIEGEL PAPER COMPANY, GENERAL CHAIRMAN. C. M. Connor, Valley Forge Laboratories, W. D. Harrison, Ecusta Paper Corporation, and A. E. Bachmann, Missisquoi Corporation, continued as chairmen of the *Preparation of Nonfibrous Materials Committee, Stuff Preparation Committee*, and the *Forming and Finishing Committee*, respectively.

TESTING DIVISION—JAMES D'A. CLARK, INSTITUTE OF PAPER CHEMISTRY, GENERAL CHAIRMAN. W. A. Kirkpatrick, Kalamazoo Vegetable Parchment Company succeeded W. F. Hathaway of the Allied Paper Mills as chairman of the *Non-fibrous Materials Testing Committee*. B. E. Lauer, North Carolina State College, W. O. Hisey, New York State College of Forestry, B. L. Browning, F. W. Bentzen, and B. W. Scribner continued as chairman of the *Fibrous Materials Testing Committee, Pulp Testing Committee, Chemical Methods Committee, Microscopy Committee*, and the *Paper Testing Committee*, respectively.

In the *Paper Testing Committee* the Chemical Testing Methods Subcommittee was discontinued. S. C. Fairbanks of the Hamersley Paper Company was appointed chairman of the new *Absorptiveness to Paraffin Subcommittee*. E. J. Albert, Thwing-Albert Instrument Co. and P. W. Codwise, Beaver Wood Fibre Company, continued as chairmen of the *Testing Instruments Subcommittee* and the *Writing and Erasing Properties Subcommittee*.

MISCELLANEOUS COMMITTEES—R. A. Hayward, Kalamazoo Vegetable Parchment Company, R. C. Griffin, A. D. Little, Inc., E. W. Tinker, John L. Parsons, Hammermill Paper Company, and George Carruthers, Interlake Tissue Mills, continued as chairmen of the *Finance Committee, Standards Committee, Certified Pulp Testers Bureau*, the *Research Appropriations Committee*, and the *Joint Textbook Committee*, respectively.

TAPPI Medal Award

Ralph A. Hayward spoke as follows in presenting the TAPPI medal to Robert B. Wolf:—

The bylaws of the Technical Association of the Pulp and Paper Industry provide for special recognition to any individual whose achievements have defi-

nitely contributed to the technical progress of the pulp and paper industry. It is recognized that technical progress may be accomplished in several ways:

(1) by direct research and invention, contributing either new processes, methods, or machinery to the industry;

(2) by contributing to the available literature in one form or another which, in turn, assists others to improve their knowledge of the industry;

(3) such contribution may be made by new and improved management methods that improve the relationships existing within the industry and that stimulates the creative thinking power on the part of people in the industry;

(4) by sponsoring and promoting scientific study and research and assisting in providing the means by which this work is carried on;

(5) by giving opportunity and responsibility to young men and then advising them and teaching them so that they in turn may make their contribution to the industry.

Robert B. Wolf has contributed to the technical progress of the industry by all of these means, his contribution in any one field being sufficient to justify the recognition that we are giving to him at this time. I represent one of the many men who first started in the industry with Mr. Wolf. Through his counsel, advice, and direction we were soon able to assume responsibilities and through his assistance we found the opportunity to demonstrate our ability. As a representative of this group of men, many of whom are occupying positions of great responsibility in the industry today and most of whom are members of the Technical Association, it gives me great pleasure to publicly acknowledge our debt of gratitude to Mr. Wolf for the help and assistance he has given to us.

Mr. Wolf is a graduate of the University of Delaware with the degree of Bachelor of Science and Electrical Engineering, later receiving the degree of Mechanical Engineering from this institution.

His father was a professor of chemistry at the University of Delaware. After graduating from college, Mr. Wolf worked in the pulp and paper mills in northern New York and New England gaining a great deal of practical experience. He then entered the engineering department of the International Paper Company and later became superintendent of their Piercefield sulphite mill. When the Union Bag and Paper Company decided to build a pulp mill at Hudson Falls, Mr. Wolf was chosen to design and supervise the building of the mill and later assumed the responsibility for its operation.

R. B. Wolf
TAPPI Medalist

Mr. Wolf later moved to Berlin, N. H., as manager of manufacturing for the Burgess Sulphite Fibre Company. Here he developed scientific methods of manufacture and means of evaluating qualitative and quantitative manufacturing variables in the manufacturing processes. By the use of scientific methods of this kind, the quality and quantity of the pulp improved greatly, and the company was recognized throughout the world for its high standard of quality and uniformity of product. Methods were developed which evaluated and recorded the work of individual operators which in turn developed their interest and assistance in the development of the product. Mr. Wolf has contributed many papers before many organizations on the subject of non-financial incentives in industry and has demostrated that it is possible to release the creative powers of individual workmen by such methods. In 1917 he became manager of the Spanish River Pulp & Paper Company's mills in Ontario, Canada. During the first World War he was staff assistant to the Director General of the United States Emergency Fleet Corporation.

At the conclusion of the war he entered into the consulting engineering business in New York City, supplying the pulp, paper, and paperboard industry with improved equipment and processes. Previous to this time he had been granted many patents covering various aspects of pulp manufacture, particularly in the line of acid making, sulphur dioxide recovery, and special equipment for cooking.

He was a pioneer in the use of strong acid in the pulp manufacturing process and many of these patents cover the use of high pressure and refrigeration in acid making. He also pioneered the bleaching of pulp at high consistency and developed special equipment for accomplishing this purpose.

From the beginning of his experience in the pulp industry, he was interested in functionalized cost accounting and was one of the pioneers in the development of cost accounting methods in the industry. He is the author of many technical articles on labor, management, and other scientific subjects. He was one of the original group that organized the Technical Association and at one time served as vice president of the organization. He has served on the Board of Directors of the American Society of Mechanical Engineers and now holds a fellowship in that Society. In addition to this he maintains an active interest in many other scientific and management associations.

In recognition of the many valuable contributions that he has made to the technical progress of the industry, it gives me a great deal of pleasure to present to him, on behalf of the Technical Association of the Pulp and Paper Industry the TAPPI Gold Medal Award.

Mr. Wolf Accepts Award

In accepting the award, Mr. Wolf responded, expressing his deep appreciation of the honor extended to him. He then read a paper entitled, "Suggestions for a Scientific Approach to the Study of Human Nature".

I can think of no better way to begin this paper than to quote from Thomas H. Huxley's essay, "Science and Education" written in 1898. This is what Huxley had to say:

"The life, the fortune, and the happiness of everyone of us depends upon our knowing something of the rules of a game infinitely more complicated than chess. It is a game that has been played for untold ages, each man and woman of us being one of the two players in a game of his or her own. The chess board is the world, the pieces are the phenomena of the universe, the rules of the game are what we call the laws of nature. The players on the other side is hidden from us. We know that his play is always fair, just, and patient. But we also know to our cost that he never overlooks a mistake or makes the smallest allowance for ignorance. To the man who plays well, the highest stakes are paid with that sort of overflowing generosity with which the strong delight in strength. And one who plays ill is checkmated, without haste but without remorse. My metaphor will remind you of a famous picture in which a great painter has depicted Satan playing at chess with a man for his soul. Substitute for the mocking fiend in that picture a calm strong angel who is playing for love, and would rather lose than win, and I should accept it as an image of human life. Well, what I mean by education is learning the rules of this mighty game. In other words, education is the instruction of the intellect in the laws of nature, under which name I include not merely things and their forces but *men and their ways.*"

It is unnecessary for me to stress before a group such as this the need for learning about "things and their forces". We all know of the progress that has been made in the manufacture of pulp and paper as a result of the activities of the Technical Association.

What I do want to suggest, however, is that further progress in the knowledge of the material universe, as recorded in the so-called physical sciences, without a corresponding progress in our understanding of "men and their ways" will avail us little. In fact, the destructive use of the power which results from scientific knowledge is making a shambles of many of our long cherished institutions.

I do not propose to offer a formula for arresting the disintegration of civilization. All I hope to accomplish is to indicate general principles to follow if we are to synthesize the knowledge already available in the "Facts" accumulated by the various branches of science. The purpose of such a synthesis is of course to arrive at an understanding of man's function in the evolution of the earth.

First, I will ask you to recall that more recent discoveries of science tend to show that evolution is not so much a continuous as it is a "step-like" process. The Periodic Law formulated by Mendeleyeff records the periodic recurrence of similar characteristics that took place in the process of building up elements of higher and higher atomic weights. There seems to have been an end to the period of atom building. This period, however, was followed by one during which molecules were formed out of preexisting atoms.

What I would like to suggest for your consideration is that, while in a cosmic sense, evolution is progressively forward, it is not continuous in the ordinarily accepted sense of an unbroken linear advance in the same direction. At certain definite and highly significant periods in the process there seems to be a "change of direction". And this change is invariably preceded by a period of disintegration.

The evidence also indicates that this disintegration coming at the end of each periodic series is a necessary step in the main process of evolution in order to provide the substance out of which the units in the succeeding period, or stage, may be formed.

If this observation is confirmed by scientific research as being inherent in the evolutionary movement itself, then it may be possible to account for the apparent breakdown of many of the institutions which together form what we call civilization.

Mr. Wolf then went on to sketch the development of the evolutionary process through the mineral, vegetable, animal and human kingdoms, indicating that in the process of mineral evolution, matter or substance was formed. Each major unit in the mineral kingdom being a focal center through which energy was distributed into space.

He then pointed out that the vegetable kingdom which followed derived its substance from disintegrated minerals and its energy of the sun, but that the motive of accumulation of energy was the outstanding characteristic of the vegetable kingdom.

Then followed a description of the animal as an energy distributor, the energy being obtained from disintegrated vegetables. Animal evolution finally culminated in the Genus Homo with a type of body so responsive to the "universal" life that creation changed from the generic to the individual level of existence.

Individual self-consciousness started the process of accumulation of knowledge through the means of the symbolism of language. Thus man began to accumulate the knowledge which enabled him to dominate the animal kingdom, destroying its genera wherever they interfered with the integration of his social institutions. This, Mr. Wolf pointed out, man could do because his accumulated knowledge of nature's laws and forces gave him command of power to direct basic energies to his own use.

He then showed that the inevitable use of man's acquired power, coupled with his normal egotism, eventually brought about the present world conflict and that nothing but the change of direction, namely from accumulation to distribution, as a motive of life could arrest the process of disintegration so evident in the light of present world events.

Mr. Wolf concluded as follows:—

The "change in direction" which began when man appeared while it emphasized accumulation was nevertheless intellectual rather than physical. And necessarily so, because it was a *conscious* process in contrast to the *sub*-conscious procedures in the animal world. Knowledge of "men and their ways" while it can be recorded through means devised by the mind of man should be used and directed with "spiritual" motives, if the indicated change in direction is to result. Nowhere have these new motives been so clearly expressed as in Christian teaching. Because Christianity is in harmony with the indicated "change in direction", it is under attack from the powerful cults of "materialism" the world over, and we are now called upon to fight for the preservation of those things we hold sacred and which are so clearly expressed in the American Constitution and the Bill of Rights.

What we have to preserve is a way of life, so mere flag waving will not do the job. Only a determined, consistent and enthusiastic all-out fight against dishonesty, corruption and brutality in all its forms will win this war.

Starches in Paper and Paperboard Manufacture*

By James P. Casey[1]

Abstract

This paper is an attempt to present some practical and theoretical considerations of starch as applied in the papermaking processes. The types of starch and uses in the paper mill are discussed with special emphasis placed on the comparison of different types for each paper mill use. An effort has been made to show why certain types of starch have become established for certain operations and to point out how starch can best be used by the paper and paperboard manufacturer.

In this period of war it is well for paper mill suppliers to gather together the available fact and theory regarding the use of their products in order to make the best use of this information in any future developments. At a time when it is necessary to get the most out of materials, it is desirable to review what is known about the types and characteristics of starch available. Since no shortage of starch is foreseen, the manufacturer can choose the type of starch most effective for his use without recourse to less suitable substitutes, and it is not necessary to discuss the use of starch substitutes at this time. It is intended to review the general use of starch in the paper mill to better understand why definite types of modified starch have become established for certain applications and to help in promoting the most intelligent use of starch in the future. An effort has been made to present some of the most important considerations to be weighed in the choice and application of starch.

There are three principal groups of corn starch on the market today. These are *native* starch, *chemically modified* starch, and *mixtures* of starch (either native or modified) with other chemicals. Of the three groups, chemically modified starches are of most importance to the papermaker and include the following types of modification:

1. oxidized starch (chlorinated starch)
2. thin boiling starch (acid-hydrolyzed)
3. dextrin (acid roasted)
4. enzyme converted starch
5. special converted starch.

Starches

Native starch is made in either the pearl or powdered form and is marketed under the name of either pearl starch or powdered starch. Most paper mills find it unnecessary to use powdered starch, although there are a few mills that prefer a powdered starch when adding dry starch at the beater. Pearl starch (which will mean *native* starch throughout this paper) is starch that has not been modified by strong chemicals, and since the molecular structure has not been disturbed, pearl starch will form a solution or paste of high viscosity when cooked. It has a strong gelling tendency and will set to a solid gel on cooling when cooked at concentrations as low as one half pound per gallon. Pearl starch gelatinizes in water at a temperature around 185 deg. F., although this gelatinization is a gradual process. Pastes prepared with pearl starch are opaque. Pearl starch is used where strong gelling properties are desirable, where maximum viscosity is sought for, and where a modified starch is not necessary and cheapness is imperative. Since native starch is the base from which all modified starches are made it sells for the lowest price, but pearl starch has certain limitations, and for most users in the paper mill it is necessary to use a modified starch for best results.

Starch mixtures are made by mixing pearl starch or modified starch with chemicals. This type of product is not common, although the commercial adhesives fall in this class, being mixtures of dextrin and added alkalies.

Thin boiling starches are modified starches made by treating native starch with acid while suspended in water. They are similar to pearl starch in properties and form opaque pastes when heated in water. Thin boiling starches form pastes that have a decided tendency to gel on standing, although this depends on the degree of conversion, and it is possible to carry the conversion to a point where these starches have practically no gel-forming properties. These starches are made in many viscosities which can be regulated at the starch plant by the time of treatment. This type of starch is sometimes used in the paper industry, although it finds its greatest use in the textile industry. Although the properties of this type of starch are similar to native starch, there are certain advantages derived from their lower viscosity that make them useful. It is possible to concentrate a greater amount of starch in a given volume, depending on the viscosity of the starch, and thus apply a greater amount of starch to the treated paper. Although each unit of thin boiling starch may have lower strength than a unit of pearl starch, as measured by the tensile strength of their films, it is possible to apply a larger number of units to the treated object.

Since it is necessary to expend considerable work on the preparation of thin boiling starch, they sell for a higher price than pearl starch and are intermediate between pearl starch and the more expensive oxidized starch.

Dextrins are roasted starches. They are generally made by mixing acid intimately with native starch and roasting in converters at elevated temperatures until the starch has been converted to the desired degree. Dextrins are usually highly converted starches, although products of relatively high viscosity can be produced by using a short converting time. Dextrins usually contain a high percentage of highly degraded starch that is soluble in cold water, together with starch which has been barely acted upon at all. This water-soluble portion can be removed in the other types of conversion where water is used, but it is impossible to remove it in the dextrinizing process. This feature makes dextrinized starches unsuitable for many types of work.

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 16-19, 1942.

[1] Member TAPPI; Paper Chemist in the Sales Service and Development Laboratories, A. E. Staley Manufacturing Company, Decatur, Ill.

Oxidized Starches

Oxidized starches are modified starches made by treating starch with hypochlorite in water suspension. This type of starch is frequently referred to as chlorinated starch or starch gum. Oxidized starches are most unlike native starch in properties and produce cooked solutions that are transparent when hot and have little tendency to congeal on cooling. This type of starch forms better films than other types of modified starch and has unusual colloidal properties which give results that no other type of starch now known can produce. Oxidized starches are more costly to manufacture than other types of modified starches and conseqently sell for a higher price, but for many uses in the paper mill this is more than offset by the effectiveness of this type of starch. Faced with high pulp costs and, in some cases, inferior pulp, cost of starch becomes secondary today and it is desirable to use the most effective starch obtainable, which, in many cases, is an oxidized starch.

Special converted starches are of many different types. They may take the form of a dextrinized starch made with a different acid; an oxidized starch made with a different oxidizing agent; or any one of unlimited possibilities for changing the conditions of the standard types of modification.

Enzyme-converted starches are always converted in the paper mill as it is necessary to partially swell the starch granules before the conversion will proceed at a rapid rate. Native starch is used for the conversion, but there have been improvements made in corn starch within the past year to increase its effectiveness in enzyme conversion. To obtain solutions of the same viscosity from day to day it is necessary to maintain the same conditions of pH, conversion time, temperature, concentration, per cent enzyme, etc. Most of these factors must be controlled at the paper mill, but starch manufacturers generally watch closely the pH of the special starches for enzyme conversion. Starches convert at different rates, depending on their method of preparation. This is shown in Fig. 1 comparing two commercial starches under identical conditions of pH, temperature, per cent enzyme, etc. The per cent enzyme was varied from 0.5-1.0% on the basis of the starch and a standard conversion run at 158-160 deg. F. for 20 minutes. After destroying the enzyme, viscosity tests were run on the converted solution by taking the time of efflux from the Saybolt funnel with the standard tip at 125 deg. F. Although this much difference is not generally experienced in mill practice, it is well to run laboratory conversion tests on any new starch submitted for trial. The commercial enzymes also differ in the ease with which

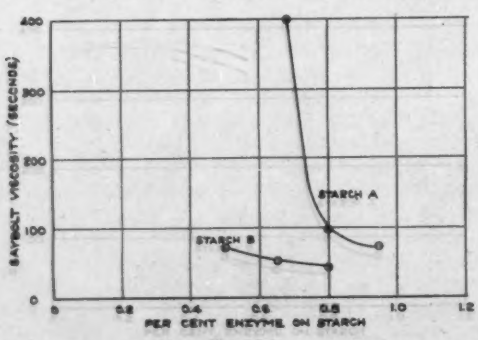

Fig. 1
Comparison of Two Commercial Starches for Enzyme Conversion

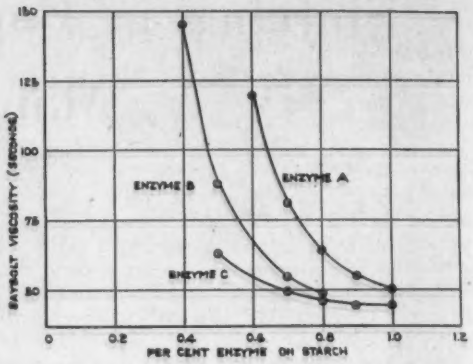

Fig. 2
Comparison of Three Commercial Enzymes for Activity with Starch

they liquefy starch. This is shown in Fig. 2 comparing three commercial enzymes under identical conditions. Enzymes not only differ in the rate with which they convert starch, but each enzyme produces a somewhat different type of solution. Recently the enzyme manufacturers have greatly increased the activity of their enzymes. The improvement made in converting power is shown in Fig. 3 where the viscosity of the converted starch solution is given for varying percentages of both the old and the new types of enzyme from one manufacturer.

Enzyme-Converted Starches

Enzyme-converted starches are frequently used for making tub- and calender-sizing starches suitable for many grades of paper. There are certain applications for which enzyme-converted starches are not suited, and it is for these applications that it is wise to buy a modified starch.

The length of time of treatment, the amount of converting agent, or other controlling factors can be regulated in any of the preceding types of conversion to produce starches of different viscosities. Thus there are oxidized (chlorinated) starches that are extremely viscous when cooked at one pound per gallon and others that are extremely thin when cooked at two pounds per gallon. This is shown in Fig. 4 which shows the viscosity curves for five different oxidized (chlorinated) starches which are the same in every respect but degree of conversion. In all of the types of modified starch it should be remembered that each has been chemically modified—i.e., there has been a change in the molecular structure. One of the important reasons for modifying starch is to obtain a starch of the desired viscosity, but it should be recognized that degree of modification affects the other properties of the starch as well.

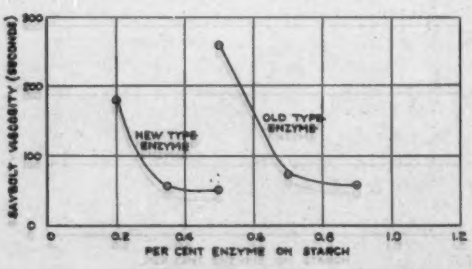

Fig. 3
Recent Improvement Made in Activity of one Enzyme

Calender Sizing

Most paperboard mills use a starch solution in one of their waterboxes on the calender stacks. Calender sizing is almost purely a surface addition and it is generally used to improve the surface of the paperboard and lay the fuzz on the sheet, although in some cases where a highly modified starch of low viscosity is used, there is enough penetration to result in improved bursting strength. Calender starches are generally modified starches offered by the starch manufacturers, although for some uses paperboard mills have used pearl (native) starch with good results. The choice of a suitable starch depends on the results to be achieved and it is generally determined by the amount of starch to be applied to the sheet. Starches made by a slight modification of the thin-boiling process are generally used for this operation, although other types of starch are frequently used. Oxidized starches are considered too expensive for the usual application, although in cases where flexibility of the film is of importance they are often used. Highly modified starches that can be applied at high concentrations are used where it is desirable to add a heavy starch film to board, such as that to be used for gloss ink printing. It is not uncommon to hear of starches being applied on the calender stack at concentrations of one and one half to two pounds per gallon and even higher. A paperboard that has been given a treatment on the calender stacks with starches at such high concentrations will have a greatly improved printing surface and the starch will often more than pay for itself by the saving in printing ink. In addition, some improvement in bursting strength is generally noted when starch is used at these high concentrations.

Slightly modified starches of high viscosity, or even pearl (native) starch, are sometimes used on the calenders when only a light application of starch is desired and little penetration is required. A slightly modified starch or pearl starch will produce a surface more resistant to scuffing and rubbing than that produced by a highly modified starch. For this reason many mills making heavy papers for shipping containers find it desirable to use the high viscosity starches.

Occasionally a mill will experience trouble with picking on the calenders when using starch. This depends on the type and hydration of the liner stock and is sometimes experienced on such grades as white patent lined board. In such cases the starch solution should be applied as dilute as possible or a more highly modified starch should be used. There are special calender starches on the market to which lubricant has been added and these are recommended in such cases. Many paper mills use wax emulsions and other compounds with their calender starch to obtain special finishes or other special effects.

All common types of modified starches, with the possible exception of dextrins, are used on the calender stacks. It is essential to choose a starch of the proper viscosity for the job, but the type of starch used is also important from standpoints of results obtained, ease of handling, and cost.

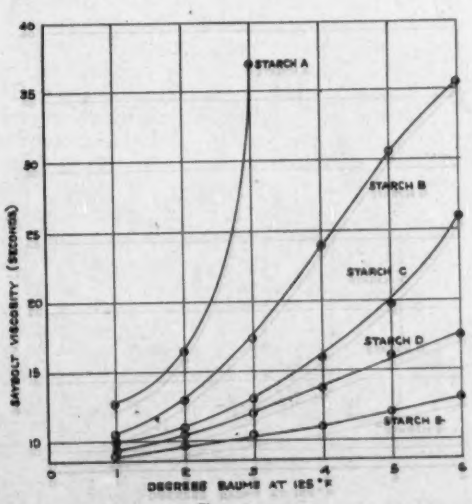

FIG. 4
Viscosity Curves for Five Commercial Oxidized Starches

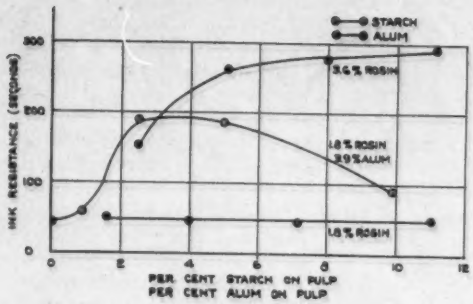

FIG. 5
Effect of Rosin, Alum, and Oxidized Starch on Sizing of Handsheets

Tub Sizing

Many grades of paper are run through a size tub or size press in the drier section. Tub sizing is considered to be a surface application, although there must always be some penetration. The amount of penetration depends on the temperature of the solution, the pressure used on the size press, the concentration of the solution, and the viscosity and type of starch used. The temperature generally used is between 125 and 140 deg. F. and the concentration varies from 0.5 to 4.0 Baumé or higher.

Highly modified starches of low viscosity are used at high concentrations when it is desirable to get a lot of starch on the surface and into the sheet. With these highly modified starches it is possible to obtain enough penetration to build up the burst and other physical tests. An oxidized (chlorinated) starch of

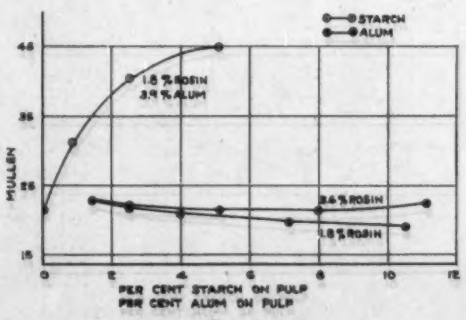

FIG. 6
Effect of Rosin, Alum, and Oxidized Starch on Burst (Mullen) Test of Handsheets

low viscosity will help to build up the internal sizing of a sheet. Slightly modified starches of medium viscosity are frequently used where it is desirable to keep the starch on the surface. These starches are used where it is desirable to improve the writing surface and increase the erasibility.

Oxidized starches (chlorinated) are most suitable for this type of sizing, although other types of modified starches are used on certain grades of paper with excellent results. Oxidized starches are almost exclusively used on blueprint and other high-rag content papers, but many mills making lower priced writing and ledger paper find oxidized starches to be the most satisfactory product from every standpoint. These starches result in better ink resistance, better surface, and generally in higher test than any other type of modified starch, particularly on the better grades of paper. However, enzyme-converted starches and special thin boiling starches are very commonly used for tub sizing, particularly on the cheaper grades of paper.

With the cost of pulp at a high level, many paper mills are using greater amounts of starch than ever before, and the trend in tub sizing is toward the use of higher concentrations to pick up as much starch as possible.

Beater Sizing

Beater sizing is the easiest method of applying starch. The addition of beater starches gives internal strength to the paper as the starch is distributed more or less uniformly throughout the sheet. The addition of starch at the beaters generally results in higher burst, higher fold, higher tensile, less surface fuzz, higher wax pick test, and, with some starches, better sizing. Starch can be added at the beaters either cooked or uncooked, depending on the starch used and the results desired. Starches should generally be cooked for best results, although if temperatures are maintained high enough on the first half dozen driers on the paper machine, uncooked starch can be used, particularly on heavyweight papers. Pearl starch, added uncooked, requires that the sheet reach a temperature around 185 deg. F. throughout on the first few driers while there is still enough water in the sheet to paste the starch. There are several pregelatinized beater starches on the market which are good, but the good ones are expensive and the cheaper ones are satisfactory for only certain grades of paper. Since oxidized starches will paste around 165 deg. F., they can be used uncooked with better results than pearl starch, and another advantage is that their low viscosity helps to promote more uniform distribution of the starch through the sheet after pasting. All types of starch from pearl to special modified starches are used in the beaters, depending on the results to be achieved. Pearl starch is the cheapest starch and it is used where low cost is necessary and where high stiffness is desirable. Oxidized starches are quite expensive, but they have many special properties which make them desirable, and, for example, they will act as a protective colloid on the rosin size and insure better distribution. This is shown in Fig. 5 which are laboratory results showing the effect of rosin, alum, and an oxidized starch on the ink resistance (flotation on a water-base ink) of a sheet of paper. This work was done with an alkaline water that was difficult to size, but it can be seen that the oxidized (chlorinated) starch resulted in greatly improved sizing. Two curves show the effect of alum on a pulp containing 1.8 and 3.6% rosin size, respectively, and the other curve shows the effect of per cent oxidized starch on the same pulp containing 1.8% rosin size and 3.9% alum. The effect on the burst test is shown by Fig. 6. Under the particular water conditions of these laboratory tests, 1.8% rosin size did not produce a well-sized sheet, although the use of 3.6% rosin size did result in a highly sized sheet when precipitated with over 5% alum on the basis of the pulp. When oxidized starch was added to the pulp containing 1.8% rosin, the sizing of the finished sheet was increased, and, although it was still less than the sheet containing 3.6% rosin, a very marked increase was noted in the range of 2.5 to 5.0% oxidized starch on the basis of the pulp, but with higher amounts a definite decrease was noted. The burst test of the sheets sized with 1.8 and 3.6% rosin were close, but this test increased very rapidly for increases in the amount of oxidized starch used.

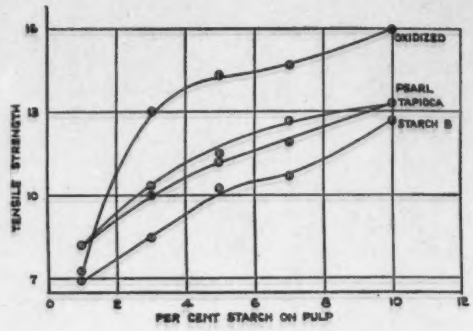

FIG. 8
Effect of Per Cent Starch on the Tensile Strength of Handsheets Showing Four Beater Starches

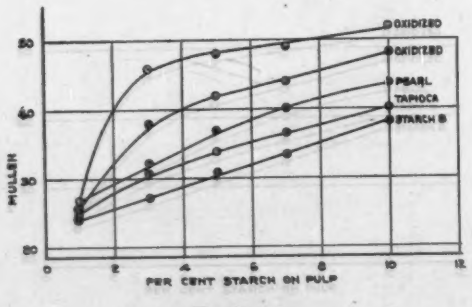

FIG. 7
Effect of Per Cent Starch on the Burst (Mullen) Test of Handsheets Showing Five Beater Starches

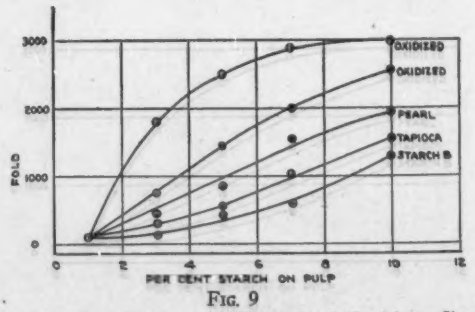

FIG. 9
Effect of Per Cent Starch on the Fold Test of Handsheets Showing Five Beater Starches

These tests indicate that oxidized starch can be used to increase the sizing of a sheet of paper, and, at the same time, increase the burst test, but that there is a limit to the increase in sizing that can be accomplished by the use of oxidized starch on any particular furnish. It should be remembered in these and following laboratory tests on beater sizing that they are used simply for illustration, and, although they show the general result to be expected in mill practice, the magnitude of laboratory results generally exceeds that of mill practice.

Laboratory comparisons of five common types of beater starches are shown in Figs. 7-10. These curves show the relative results to be expected for each starch over a range from 1 to 10% starch on the basis of the air-dry pulp. It can be seen from Fig. 7 that all starches resulted in increased burst test as the percentage starch on the pulp was increased. At 1% starch on the pulp there was little difference in any of the starches, but at 3% starch there was considerable difference. Oxidized starch gave decidedly the best test at 3% starch, and also at the higher percentages. The fact that the full effect of the oxidized starch was not felt until 2 to 3% starch was used bears out the theory that thick boiling starches such as pearl or special starch B should be used at the lower percentages of starch and that highly modified oxidized starches are indicated when high percentages of starch are used. A special starch such as special starch B might work better in practice than pearl starch if the starch is added to the beater uncooked, as it would have a slightly lower gelatinization temperature and be of lower viscosity than pearl. Figures 8 and 9 for tensile strength and fold show much the same relative results as Fig. 7. Figure 10 shows a different relationship for the ink resistance test. Tapioca starch was better on this test than pearl starch, but not as good as the oxidized starch. The peak in the ink resistance curve for oxidized starch has never been checked in the mill to the writer's knowledge, but somewhat of a peak in all laboratory results on ink resistance is generally experienced. One point not brought out in these curves is that high stiffness and good rattle are more easily obtained with pearl starch than they are with tapioca or the oxidized starches, which tend to produce a more flexible sheet.

So far little has been said about the viscosity of a given starch for beater sizing. It has been shown that the viscosity of a starch is important in calender and tub sizing, but beater sizing is an entirely different type of application. In all other applications of starch the viscosity of the starch used determines the amount of starch that can be added to the paper and this is often the principal factor in deciding on a starch of a certain viscosity. This is not the case in beater sizing, as the viscosity of the starch has no bearing on the amount that can be added to the beaters (although it does have an effect on the size of the cooking tanks). For this reason, the importance of viscosity in a beater starch has often been overlooked. However, laboratory and mill results show that viscosity is important in beater sizing. Figures 11 to 13 show the results of laboratory tests on beater sizing with different types of starch at different viscosities. Four different types of modified starch were used—oxidized (chlorinated) starch, thin boiling starch, enzyme-converted starch, and a special dextrinized starch. Each of these modified starches was obtained

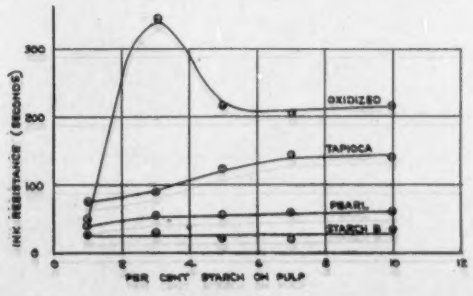

FIG. 10

Effect of Per Cent Starch on the Sizing Test of Handsheets Showing Four Beater Starches

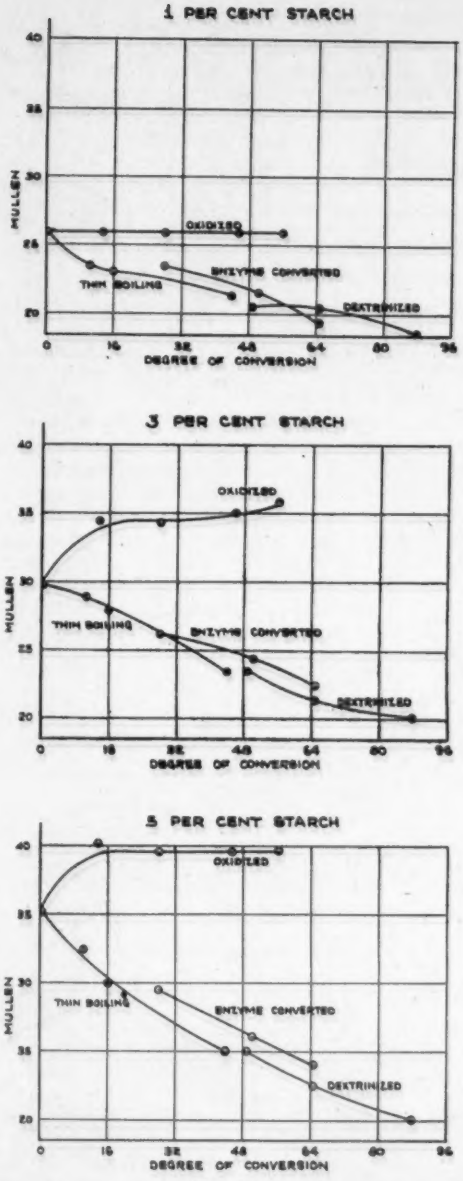

FIG. 11

Effect of Degree of Modification of Starch on the Burst (Mullen) Test of Handsheets Showing Four Types of Starch at 1, 3 and 5% Starch on the Pulp

in at least three different viscosities and each sample used for making beater tests at 1, 3, and 5% starch on the basis of the air-dry pulp. Dennison wax pick tests, burst tests, and ink resistance (flotation on a water-base ink) tests were made on each run. The figures from 0 to 96 on the abscissa of each curve are arbitrary figures taken from some work done on coating and used to denote the degree of conversion or viscosity of the starch. Figure 11 shows the effect of starch viscosity on the burst test at 1, 3, and 5% starch on the pulp. Figure 12 shows the effect of starch viscosity on the Dennison wax pick test at 1, 3, and 5% starch. Figure 13 shows the same thing for the ink resistance test. One thing that is obvious for the four types of starch, with the exception of the oxidized starches, is that the test falls off as the conversion of each starch is increased. This is particularly noticeable on the burst test. The ink resistance test obtained with the oxidized starches reaches a maximum and then falls off with oxidized starches of extremely low viscosity. The loss in burst test experienced with a decrease in the viscosity of enzyme converted, thin boiling, and dextrinized starches can be explained by the loss in intrinsic adhesive strength

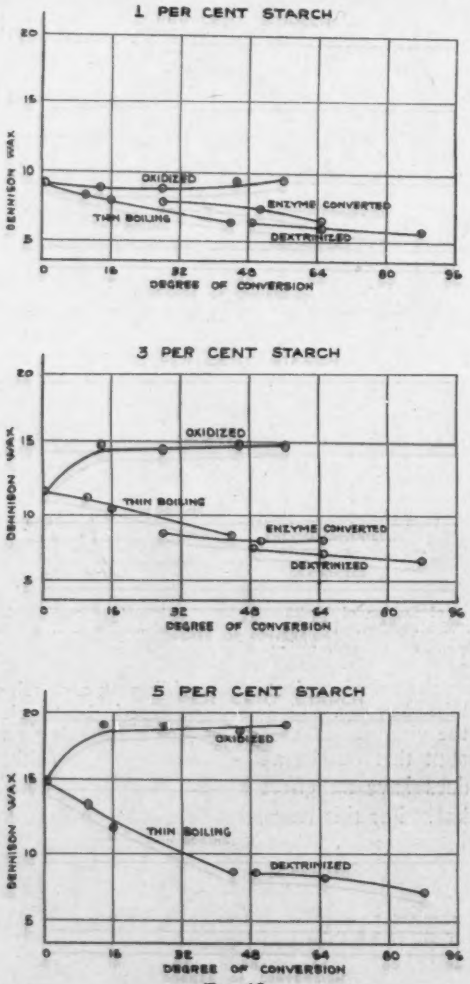

FIG. 12

Effect of Degree of Modification of Starch on the Dennison Wax of Handsheets Showing Four Types of Starch at 1, 3, and 5% Starch on the Pulp

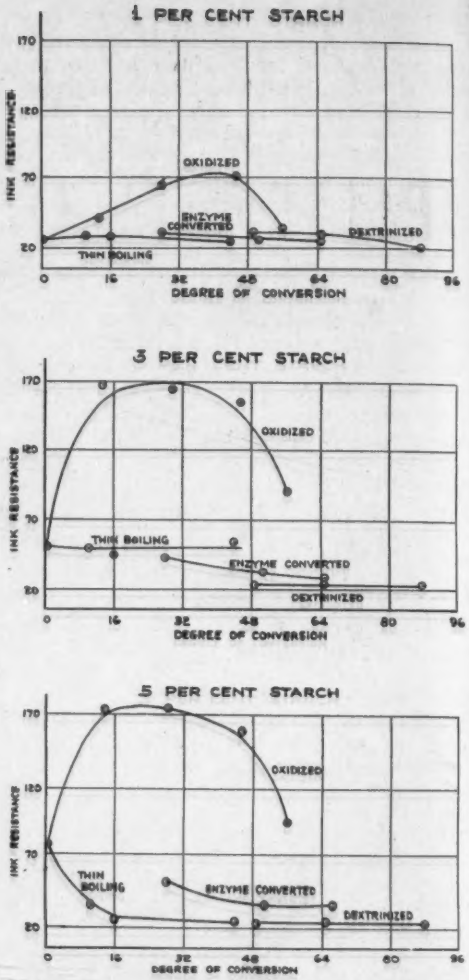

FIG. 13

Effect of Degree of Modification of Starch on the Sizing of Handsheets Showing Four Types of Starch at 1, 3 and 5% Starch on the Pulp

through a decrease in the molecular weight. That this loss in burst is not experienced with the oxidized starches, although the molecular weight is decreased, serves to show the unique properties of this type of starch. Many attempts to produce these desirable characteristics by the use of other oxidizing agents have not been successful. The range of viscosity studied extends from pearl starch on the far left (degree of conversion 0) to a very highly dextrinized starch (degree of conversion 88) on the extreme right. In addition to the results shown on these curves, a highly modified starch will generally tend to come to the surface of the sheet and result in a greatly improved surface.

The above results show that different types of modified starches and different viscosities in the same type of modified starch give different results in beater sizing. The first statement is particularly true about oxidized starches, since they give results on improved ink resistance that other types of modified starch do not produce, and oxidized starches are generally considered to produce a higher maximum burst than other types of starch.

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WAX IN ROSIN SIZES SOLVES IMPORTANT PROBLEM. To economically attain improved pliability without sacrificing other essential characteristics such as water resistance and strength is partially a matter of determining upon a suitable sizing formula. Since rosin size alone will tend to stiffen paper, the addition of a satisfactory modifying ingredient to the sizing formula is often made. A wax size in proper proportion, Cyanamid paper technicians have found, will solve the problem nicely. Cyanamid will be glad to assist you to determine the proper grade and percentage of wax size required in relation to the particular paper and methods of mill operation.

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The use of wax size usually not exceeding .2% based on the dry weight of the fiber, thereby increasing the pliability of kraft pulp paper, has been a factor in the increasing use of kraft pulp throughout the industry. Details and recommendations may be obtained by addressing Cyanamid.

FLEXIBILITY VS. RELATIVE HUMIDITY

Wax sizes offset the tendencies of paper to crack and break due to loss in moisture content. This is a particularly important advantage in cold weather when indoor humidities are likely to be low.

Developing the means and methods to improve the manufacture and broaden the usefulness of paper and paper products is the service that Cyanamid paper technicians, field men of broad practical experience, extend to the paper industry. Backed by Cyanamid laboratory research and development these men are available for consultation on any problem involving use of paper chemicals.

If you have a technical problem concerning flexibility – or any other subject related to the use of chemicals – feel free to call on us for further information. It involves no obligation.

Wax size used in conjunction with rosin size keeps raw stock flexible so that it will handle well on the festoons of the coating machine and in the printing to follow.

Hanging papers will exhibit high water resistance and flexibility to conform to corners and other contours when one of the newer wax sizes is used with the rosin size during manufacture.

Use of wax in sizes makes writing surfaces more resistant to pen and ink. Wax sizes are particularly applicable to envelope papers that should fold without flat surfaces or cracks.

Box boards and die pressed products handle and shape to the die more readily by the use of wax as a plasticiser in the sizing operation. A flexible size also protects the water resistance of the paper board at folded edges and corners.

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Coating

Within the past few years tremendous quantities of starch have been used for coating paper. Most of this tonnage has been used for making machine-coated paper, but some of this starch has been used on regular brush coaters. They have proved that starch can be used to replace casein in most coatings. However, starch is an entirely different type of adhesive than casein and a knowledge of its possibilities and limitations is necessary before a satisfactory change can be made. No commercial starch can be used for making waterproof coatings such as that required for tag board or other coated papers that might be subjected to the action of water. However, waterproofness is not necessary on most coatings, and for most of these starch can be used successfully. Starch can be made to approach casein in all other respects and is superior to casein in certain effects.

Oxidized starch is the type of starch that has proved most successful for coating paper. The high degree of dispersibility of this type of modified starch gives colloidal properties that are of value in preparing starch coatings. It is known that casein prepared for coating has good "freeing" action on a clay slip, and this property is also possessed by the oxidized starches, although to a lesser extent. This is shown in Fig. 14A showing the effect of an oxidized starch on the "apparent viscosity" (measured by time in seconds of efflux from standard orifice of Saybolt viscometer) of a coating clay slip at a concentration of 36.4% clay. The ratio of clay and water was held constant and it can be seen that the oxidized starch freed the clay and produced a dispersion of minimum apparent viscosity around 5 to 6% starch on the weight of the clay. That certain alkalies have a greater freeing effect than starch is shown by Fig. 14B which compares the effect of silicate (Na_2O-3.25 SiO_2), sodium hexametaphosphate, and borax on a clay slip at 66.6% clay. For this reason it is generally advisable to use an alkali in conjunction with starch for preparing coating mixes of high solids and minimum viscosity. If the alkali and water are added to the clay and the latter thoroughly dispersed, it becomes a simple matter to add the cooked starch and obtain a coating mix of high per cent solids. In this regard, a study of the effect of combinations of different alkalies with different types of starch on the ultimate flow properties of a coating mix should prove informative. Borax has a specific effect on the viscosity of starch and should not be used indiscriminately. Under certain conditions borax will increase the wax pick test, but it will increase the viscosity of the starch and change its flow characteristics and should not be used if these changes are undesirable.

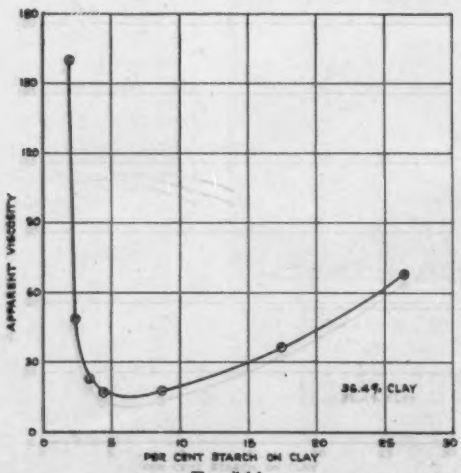


FIG. 14A

Effect of Oxidized Starch on the Apparent Viscosity of a Clay Slip

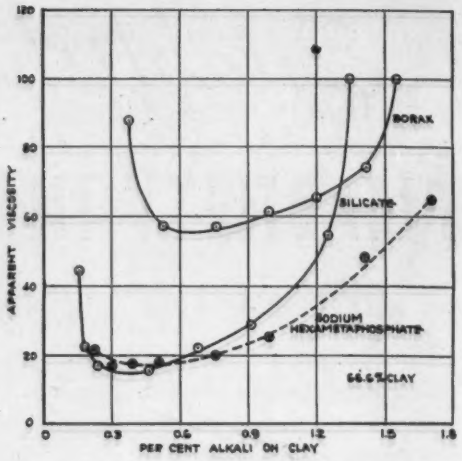


FIG. 14B

Comparison of Three Alkalies in Freeing Action on a Clay Slip

There is considerable difference in the characteristics of modified starches when it comes to using them in coating formulas and, of all the different types of modified starches, the oxidized starches have proved superior. This is true in regard to characteristics of the finished coating as well as flowing properties of the coating mix. The unique colloidal properties of oxidized starches make for better dispersion and adsorption with the coating pigment, resulting in more stable coating mixes and coatings of more uniform composition. This produces a coating mix of good flow characteristics and one that will hold its water until the brushes have smoothed the coating, and, other things being equal, the final coating will have the maximum wax pick test and be free from dusting.

In Fig. 15 three different types of starch are compared with a high-grade casein in regard to the wax pick test obtained on laboratory coatings made with a medium grade clay. The percentage casein has been calculated as the percentage dry casein on the pigment and does not take into consideration the weight of alkali necessary to cut the casein. As can be seen from these curves, casein has a considerably higher bonding strength than starch, but this difference is often much less in commercial practice, and is generally less when coatings are made in the range of lower wax pick test. There would be less difference than shown between casein and starch for a Dennison wax of 4 or 5—i.e., the casein-strength curve would fall off more rapidly than the starch curve in the range of low wax pick, just as the opposite is true in the range of high wax pick test. The special coating starch is a special type of modified starch, and while it is considerably better than a regular thin boiling starch, it is not as good as an oxidized starch. It does, however, sell for a lower price. These laboratory results are useful for showing the relative effects to be expected from different starches, and while these relationships are often some-

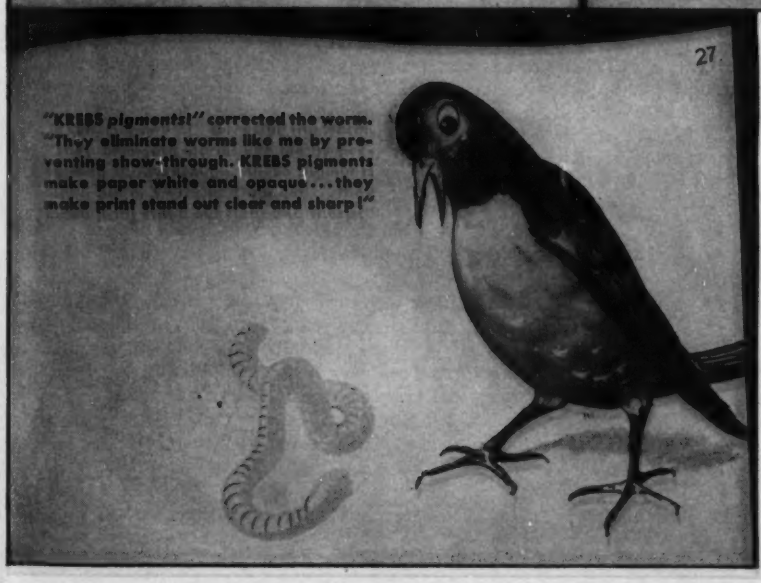
"YOU WORM, YOU!"

said the robin on page 27 to the worm on page 28

27
"What's eatin' you?" said the worm . . . who was fat, luscious and impertinent.
"That's just it," sputtered the robin, between pecks. "Ever since you showed up, I've been trying to eat you!"

27
"You can't lunch on me, my fine-feathered friend—I'm on the other page . . . I'm show-through!"
"Show-off, you mean," said the robin. "What I need is practice. My timing is off!"

27
"Timing nothing . . . you ugly duckling of the elms . . . what you need is some KREBS," teased the worm.
"Prey, tell me—is that an appetizer?" chirped the hungry robin . . . perspiration dripping from his bill.


27
"KREBS pigments!" corrected the worm. "They eliminate worms like me by preventing show-through. KREBS pigments make paper white and opaque . . . they make print stand out clear and sharp!"

"Folks, if you're bothered with show-through like Robin Redbreast, drop a line to KREBS. Take my word for it, their pigments prevent show-through and make reading easier! And if you have any technical pigment problems, the KREBS people will be glad to help you."

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what changed in magnitude when a different formula is used, they are useful for predicting the results to be obtained with any type of starch. There are other factors aside from adhesive strength to be considered in the evaluation of starch for coating paper. The most important of these is the flow characteristics of the coating mix and a study of the yield value and mobility of coating colors made with different types of starch should prove informative. There is undoubtedly some difference in the tenacity with which different types of starch will hold the water in a coating mix, although this property depends to a greater extent on the pigment used. Oxidized starches have performed satisfactorily in these respects, but information on the other types of starch is rather meager. The gloss, ink receptivity, brightness, smoothness, etc., are important considerations in a coating, and any substitute starch that was low in binding power would exert a deleterious effect on these properties due to the necessity for higher percentages of adhesive in the coating.

Each type of starch used for the results in Fig. 15 is a starch of a definite viscosity, and while these curves show the effect on the wax pick of different amounts of starch, they do not show the effect of viscosity for each type of starch. The viscosity of a starch to be used for coating is generally predetermined by the percentage solids of the coating mix—i.e., for a coating mix of high per cent solids it is necessary to use a highly modified starch of low viscosity, whereas a slightly modified starch of medium or high viscosity can be used for a coating mix of low per cent solids. For machine coating, highly converted starches of low viscosity are used, because it is necessary to keep the water content as low as possible to obtain rapid drying, and starches of low viscosity are generally used on regular brush coaters although the use of a high-viscosity starch is not uncommon. Laboratory results show that the viscosity or degree of conversion of a starch has an effect on the wax pick test. This is shown in Fig. 16, showing the effect of viscosity for four types of starch—oxidized starch, special dextrinized starch, enzyme-converted corn starch, and regular thin boiling starch. The per

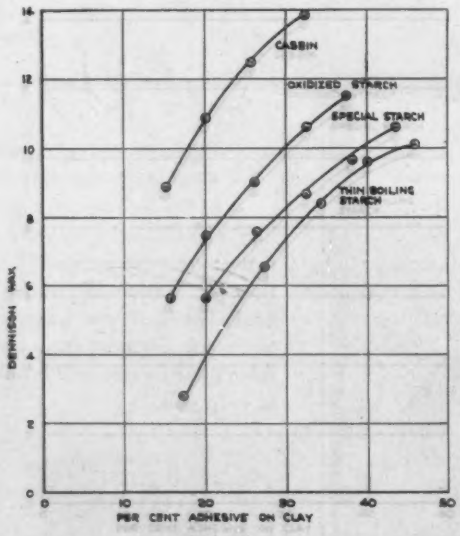

FIG. 15
Effect of Casein and Three Types of Starch on the Wax Pick Test of Clay Coating

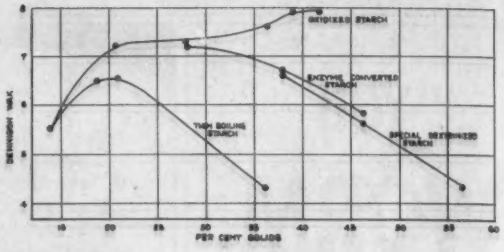

FIG. 16
Effect of Degree of Modification of Starch on the Wax Pick Test of Clay Coatings Showing Four Types of Starch

cent starch used (24% on the basis of the clay) and all other factors were the same for each coating with the exception that different viscosities were used in studying each type of starch—i.e., five different viscosities of oxidized starch and three viscosities for each other type of starch were used. For each coating the percentage solids was adjusted to obtain approximately the same apparent viscosity for each coating mix. Thus it can be seen that each coating mix for each type of starch was the same with the exception of the viscosity of the starch used and the percentage solids of the coating mix (made necessary by the difference in starch viscosity). The values on the *X* axis are the percentage solids of the coating mix (figured on the basis of the clay and water) and indirectly measure the degree of modification or viscosity of the starch. These values have the same relationship as the viscosity values for the cooked starch "solution", as measured by an orifice type viscometer, before mixing with the clay slip. The value at the far right of the curves is the value for pearl starch.

These results show that for any type of modified starch the viscosity or degree of modification has an effect on the final strength as measured by the wax pick test. This is different for different types of modified starch. For thin boiling starch, enzyme-converted corn starch, and a special dextrinized starch the wax pick test falls off rapidly in the range of higher conversions, whereas it gradually increases for oxidized starch. The thin boiling starches fall off in wax pick much more rapidly than enzyme-converted corn starch or the special dextrinized starch. In the range of slight modification there is only a small difference in the strength of all the types of modified starch used, and thus it can be seen that from the standpoint of wax pick test, the choice of starch is not so important for low-solids coatings, although oxidized starch does have some advantage over other types of starch. However, for the formulation of coating colors of high per cent solids it is necessary to use a highly modified, oxidized starch to obtain the maximum in wax pick test. Pearl starch did not produce as strong a coating as slightly modified starches, but the reasons for this are not altogether clear.

The coating weight, pH of the coating mix, type of pigment, type of rawstock, and other factors affect the results obtained with any adhesive, but the effects of these factors are outside the compass of this paper. The type of rawstock has considerable effect on the operation of a coating color, as well as the results obtained in the finished coating, but probably the biggest factor in the characteristics of any coating is the type and characteristics of the pigment used.

Oxidized starches have definitely proved their

superiority over other types of starch for paper coating as no other type of starch has the necessary combination of properties to produce the same characteristics in coating mix and finished coatings.

Adhesives

Considerable quantities of starch are used as adhesives for corrugated board and solid fiber combining. The former is a specialized use of starch, and since a thorough discussion of this process would take considerable space, it cannot be discussed in this paper.

The commercial adhesives used for combining solid fiber paperboard and pasting sheet-lined paperboard are made with dextrinized starches. These starches are made in various viscosities to conform to the requirements of different jobs. In general, the highly converted starches of low viscosity are used where a high-solids content paste is necessary, where maximum tack is essential, and where no "set-back" can be tolerated. The high viscosity dextrins are used where maximum adhesives is desired, and where low combining cost is important. Most commercial adhesives are mixtures of starch dextrins and alkalies and other materials added to obtain the desired properties.

Oxidized starch does not make satisfactory adhesives and it is never used for this purpose. Highly converted thin boiling starch will make fairly good adhesives, although in general they do not have as much tack as adhesives made with dextrinized starch, but recent tests have proved that starches made by a special thin boiling process will make excellent adhesives and have the advantage of greater uniformity than dextrins. However, dextrins remain the most widely used type of starch for the manufacture of commercial adhesives.

Conclusion

By comparing the different types of starch for the major paper mill operations it should be clear why certain types of starch have become established for certain operations. The most effective use of starch can only be attained by using a starch of the proper type and viscosity.

Sewed Closures for Paper Bags*

By J. S. Simpson,[1] G. R. Beebe,[1] and A. W. Koon[2]

Abstract

Cotton thread is replaced by spun paper or by polyvinyl alcohol filaments. Contamination of food products or of paper stock by unassimilable cotton fiber is avoided. The value of used paper bags as a papermaking resource is enhanced.

Wherever things are held together or drawn along, there is always a chance that the qualities of rope or twine or thread will fit the job particularly well. In the main, these enabling qualities are strength, flexibility, softness, and bulk. Most cordage is surpassed in any one of these characteristics by some other material or product, but only cordage possesses all desirable properties in useful proportion. The diverse demands made upon cordage accounts for the array of ropes and twines on the market, the numerous sizes, the variety of hardnesses, and the fibers in common use—manila, sisal, jute, hemp, cotton, paper, and many others of less importance. Upon this variety are imposed the modifications due to lubricants, fillers, waterproofing agents, dyes, and substances calculated to improve resistance to injurious organisms.

Twinemakers always have recognized the value of making their product waterproof and have grappled with the problem. For the most part they have shown a foolhardy kind of courage, not realizing that they dealt with the same basic substance—cellulose—that engaged papermakers. All manner of oils and waxes, resins, tars, quaternary ammonium reactants have been tried and retried, always in the hope that an economically practical waterproofer would turn up. The result of all this effort has been to fix the minds of cordagemakers on the idea that their product must be made more and more resistant to water.

One notable exception to this rule has been in common practice. A twine for tying fleeces of wool was needed which could permit the bundle to be tossed in the washing vats without introducing a permanent contaminant. Twine made of wool itself formerly was used, but some one conceived the idea of using a twine made of paper. This was strong enough if used in large sizes, cheap, and possessed the clinching merit of disintegrating when thrown into the scouring baths. This use of paper to solve a special cordage problem is of long standing.

More recently, a second exception to the general rule was recognized. Paper bags are commonly closed by pasting, stapling, or sewing. Sewing is resorted to when a tough closure is essential. Cotton sewing thread is usual, because it is fine and flexible, and accommodates itself to the rigors of modern high-speed sewing. Cement, sugar, fertilizer, chemicals have come to be handled in paper bags sewed with cotton, but cotton closures suffered one serious frailty; in certain uses the thread introduced a foreign substance into processes which could not tolerate such a contaminant.

For instance, bags of sugar used in baking and in confectionery manufacture often are carelessly opened. Scraps of the paper bag may be torn off and enter the batch, causing but little harm, because the paper disintegrates and loses its identity. Scraps of cotton thread present a different problem. They appear unchanged in the confection or baked goods, and are always taken to be "hair" by the ultimate consumer. Food users have a horror of hair in victuals exceeded only by their aversion to worms and bugs, so this is a risk which the manufacturer dares not run.

The answer to this problem, naturally, was to sew with a water-dispersible thread. The next thing was to implement this solution with a practical material, and paper was adopted. Bags sewed with paper

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were found to work just right, for the paper thread disappeared into any watery mixture. It seemed also that other important uses required the same quality. Bags of alum and other papermaking chemicals, if closed with paper thread, could be dropped in the beater without opening. The bag and thread became just so much paper stock. Cotton twine was undesirable because it contaminated the stock permanently. Again, paper bags for any purpose at all attained new and enhanced value as waste paper for repulping.

Paper for Spinning Thread

Sewing thread spun from paper thus provided the primary quality sought—that of water dispersibility. However, there remained the considerable obstacle that the papers we knew failed to function satisfactorily in high-speed sewing machines. These stitchers run tremendously fast, and impose severe stresses on the thread. Paper twines are characteristically stiff, and most attempts to make them more elastic and flexible reduce their strength. This stiffness is due in part to the fact that the aims of the paper manufacturer are far different from ours, the thread spinners. A good sheet depends upon the adhesive nature of swollen and macerated fibers, and it is precisely this quality which makes stiff thread. Again, the paper maker customarily improves finish by the use of sizing agents and by calendering, both especially undesirable to spinners of a flexible twine. Finally, he tries to keep the ratio of fibers lying in the two directions reasonably near unity. We, on the contrary desire a large proportion of the fibers to lie parallel to the machine direction.

In sum, it appears that what we want is not paper in the ordinary sense, but rather something resembling paper superficially. It should be formed from the very freest stock which can be made into a sheet. It should contain the minimum of sizing agents and be uncalendered. It should be as nearly unidirectional as possible. Spinning itself provides a strong consolidating force to compensate for that lost through the stipulated neglect of ordinary papermaking practices.

We have discovered no paper ideally meeting our needs at a bearable cost. Several papers satisfy some of the requirements. For example, facial tissue is substantially unsized and suitably soft and is reasonably cheap, but it has little strength even when properly spun. Carbon paper base is a closer approach, and mimeograph, especially mimeo-backing, is long-fibered and of relatively free stock, but these are not notably unidirectional.

It is not even certain that an all wood fiber sheet will suffice. We have had to employ papers containing at least a portion of manila fibers, although long fibered, highly purified wood pulp has shown some promise. Notwithstanding economic and technical obstacles, we have succeeded in making and marketing a limited amount of spun paper sewing thread for bag closures, and the product has done the required job.

Our program of development work for cordage has included investigations of synthetic fibers and of resins and plastics generally. Our preoccupation with such matters has brought us deviously to the idea of using a water-dispersible, filament forming polymer in a sewing thread. There are not many good ones in this category. All the attention has been the other way, that is, improvement of water resistance. Paper, textiles, cordage, synthetic plastics—every thought has been to make them all waterproof. Some of the early failures in viscose- and casein-fiber development were conspicuous for their inability to stand water. With rayon especially, this stage is long past, and material sufficiently worthless to appeal to us is no longer available.

Vinyl Alcohol Polymers

There is one material still early enough in its infancy to be accessible in a useful form. Polyvinyl alcohol is to be had, still very costly, but strong, flexible, filament forming, and above all water-dispersible. This polymer is produced in a roundabout way. The base is acetylene—limestone and coal, if we can adopt the romantic explanations of news releases and advertising. Vinyl acetate is formed from the acetylene. This is polymerized as desired and hydrolized in varying degree to produce different types of polyvinyl alcohol. Two principal kinds of variation occur. In one, the degree of polymerization changes; in the other, the degree of hydrolysis. The extent of each process is quite accurately controlled, at least so far as average composition and properties are concerned. A myriad of materials, all termed "polyvinyl alcohol" is possible, and some of these are water-dispersible, some are filament forming.

Those vinyl alcohol polymers which are water-dispersible and capable of forming threads are obtainable as water-extended syrups or as soluble granules. The latter are softenable by heat but probably not enough to permit extrusion or drawing of filaments, as is possible with nylon. Preferably, the solution is extruded, or flowed into a film which is dried. The film looks like cellophane. The dried film may be slit into ribbons which may be spun or drawn out into threads. A drawing operation is advisable in any case, because it accomplishes an orientation of the polymolecules parallel to the axis of the thread. The strength and resilience of the filament are increased thereby. The drawing also has the effect of reducing the dispersibility of the substance and due cognizance of this fact must be taken to balance the properties of the product. It seems likely that polyvinyl alcohol threads actually are stronger than necessary and will stand modification. Starch, glue, glycerol, the glycols, and certain organic phosphates and lactates are suitable extenders and modifiers. Most of them are cheaper than polyvinyl alcohol and this permit savings.

The polymer is presently expensive. This is due partly to the several stages involved in its production. It may be seen that the alcohol is an isomer of acetaldehyde, also synthesized from acetylene. The possibility of preparing vinyl alcohol and its partial esters directly is apparent. Diligent research is in progress by the producers to develop a satisfactory process. To date, only small yields have resulted and there are serious theoretical obstacles.

Two means of solving the bag-sewing problem have been described. One, using spun paper, is of immediate interest to paper manufacturers because it uses their product. Both this and the polyvinyl alcohol-type promise to affect paper manufacture in two other ways. One is the prospect of obtaining papermaking chemical in containers which can be added intact to the beater without risk of contamination. The other is the increased availability of waste bags from other users, effecting a means of conserving a valuable national resource.

Cross Sectioning of Paper*

By John H. Graff[1] and M. A. Schlosser[2]

Abstract

Methods to be used for the cross sectioning of paper depend upon the purpose of the cross-sectional study, such as the study of the relative thickness of coating, penetration of ink, thickness of different layers and binding materials, distribution of fillers or sizing, and the examination of felting characteristics or minute surface structures of a paper. For the same reasons the relative thickness of the cross sections and the embedding media, as well as the type of illumination used for the microscopic examination, is of the utmost importance.

For extremely thin sections, when the shrinkage of the individual fibers and the expansion of the paper thickness do not have to be considered, the paraffin-embedding method is the best. If somewhat thicker sections are permissible a combination cork-paraffin method is useful, and for rough cross sections, where little time is available, a plain cork method can be used; but if the shrinkage of the fibers and expansion of the thickness of the paper have to be avoided, or if the dehydrating and clearing fluids, solvents, or heat will destroy the character of the paper to be cross sectioned, a celloidin-cork method is recommended.

Microtome sections of most materials are prepared by mounting them either in paraffin, celloidin, celloidin and paraffin, glycerol gelatin, or mounting media developed for special purposes before they are cut. The medium selected depends upon the type of the material to be mounted, the purpose of the cross section, and the limit of thickness of the section required for a particular investigation.

In making mounts for cross sections of paper, it is important that the dehydration operation or the material used for clearing the section does not remove, destroy, or change any of the substances in the paper under investigation. The thickness of the cross section is important, and depends upon whether the section is to be used for the study of the interlacing of the fibers, the distribution of fillers or sizing materials, or the determination of the relative thickness of a coating, the depth of penetration of printing ink, or the thickness of different layers and binding materials in a laminated paper. The method of embedding depends upon the tendency of the mounting material to swell or shrink the cross sections to be investigated, and upon the time which can be allowed for making the section.

As paraffin embedding is relatively quick and sections 10μ or less can be made from a good mount if the microtome knife is in good condition, this method has been given much consideration. It can be used for extremely thin sections of papers whose components are not altered by the dehydrating agent, the clearing material, or the solvent used for removing the paraffin. A modification of this method — i.e., mounting the partly prepared paper in cork—can be used in cases where a minimum of time is available and also where papers have not been saturated with paraffin.

Standard Paraffin Mounts

The paper to be sectioned is cut into a ribbon four or five mm. wide and about five cm. long. It is dehydrated by treating with 50% ethyl alcohol for ten minutes, with 95% ethyl alcohol for ten minutes, and with 100% ethyl alcohol for another ten minutes. The paper is then placed in xylene for ten minutes to remove the alcohol, and finally transferred to a saturated solution of paraffin in xylene at room temperature for 30 minutes or longer in order to impregnate the paper. The strip of paper is removed from the xylene solution of paraffin and immersed in pure melted paraffin (having a melting point of 56 to 58 deg. C.) for 30 minutes, after which the temperature of the paraffin bath is lowered until it is just above the melting point. The paper strip is then removed from the paraffin, plunged back into the bath, and the dipping is continued in this manner until a candle of paraffin of the desired size is formed around the paper. This candle is quickly cooled under the tap water and trimmed for mounting in the object holder of the microtome.

The mount is placed in the holder so that the paper is parallel to the jaws of the holder; the knife is set at an angle of about 8 degrees with a tilt of about 15 degrees. The object holder is turned until the leading edge of the knife on one side and the paper on the other side make an angle of about 50 degrees (*see* Fig. 1).

The rolling or curling of the sections caused by the angle of slant can be overcome by catching the section on a camels-hair brush during the cutting. A thin film of celloidin applied to the object surface before sectioning reduces rolling and aids in keeping the fibers within the section in their proper position.

The section is floated on a drop of water on the slide, which previously has been given a thin coating of Mayer's albumen fixative. The slide is gently warmed to flatten the section and to evaporate the water. If a thin coating of celloidin has been used before cutting the section, the celloidin side is placed uppermost when the section is floated on the water.

After the water is driven off, the slide is placed in a bath of ether and alcohol to remove the celloidin,

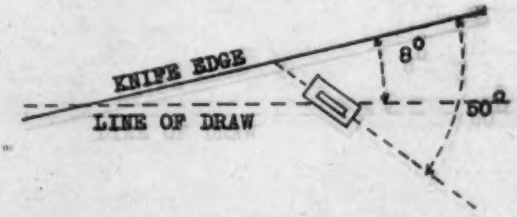

FIG. 1
The Relative Position of the Knife Edge, the Line of Draw, and the Alignment of the Paper on the Mount

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[2] Ecusta Paper Corporation, Pisgah Forest, N. C.

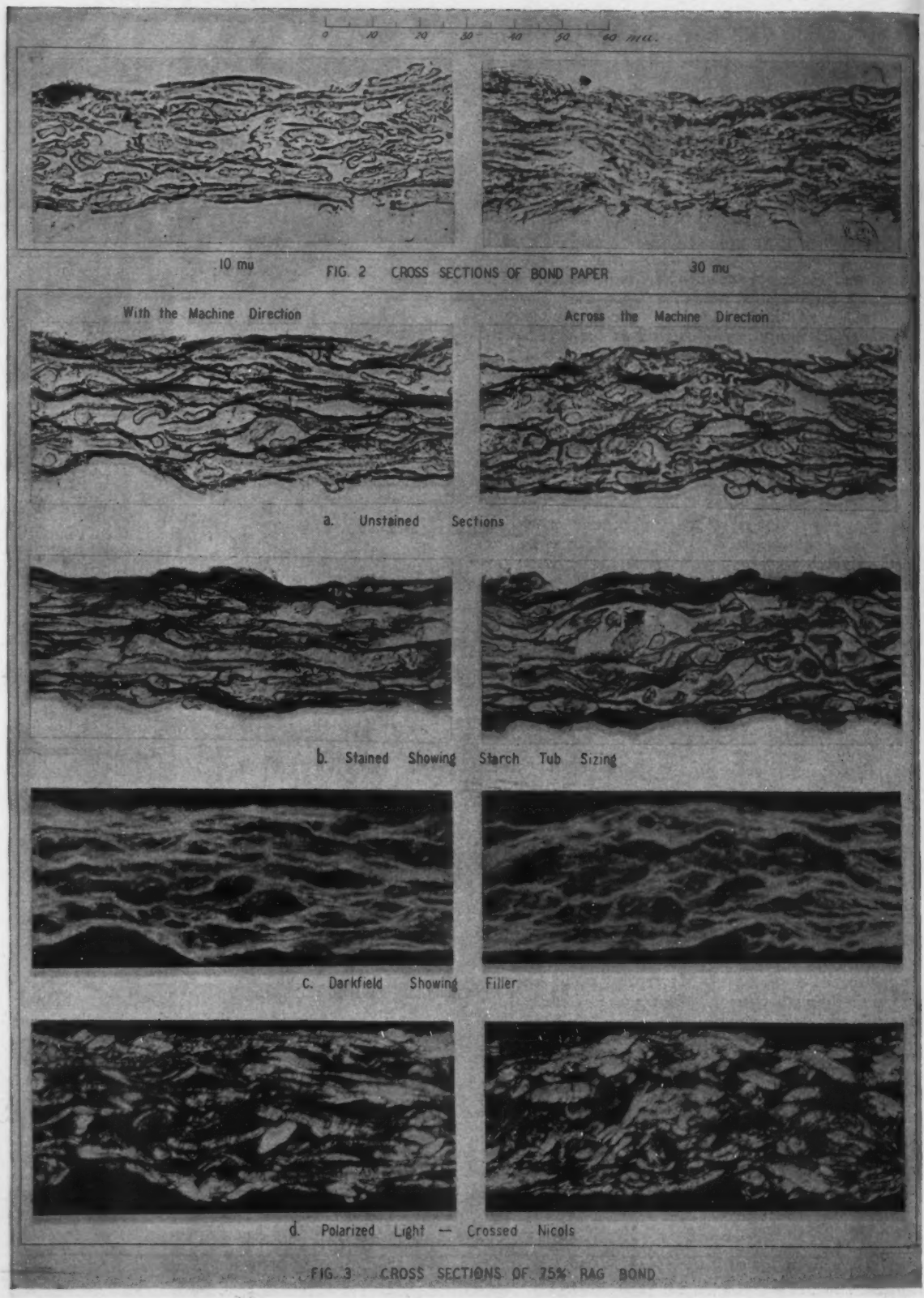

0 10 20 30 40 50 60 mu.
10 mu
30 mu
With the Machine Direction
Across the Machine Direction
a. Unstained Sections
b. Stained Showing Starch Tub Sizing
c. Darkfield Showing Filler
d. Polarized Light — Crossed Nicols

FIG. 2 CROSS SECTIONS OF BOND PAPER

FIG. 3 CROSS SECTIONS OF 75% RAG BOND

FIGS. 2 AND 3

then into xylene to remove the paraffin, and finally into alcohol to remove the xylene, after which the section is stained, if necessary, and mounted in diaphane.

Good sections, 10μ or less, are easily obtained by this method. An idea of the importance of the relative thickness of the section may be obtained by comparing the 10μ and 30μ sections of a bond paper as shown in Fig. 2.

It is less difficult to cut in the cross machine than in the machine direction of the paper, but in some instances sections cut in both directions may be necessary.

Alcoholic solutions of dyes are more advantageously employed than aqueous solutions and should be applied just before mounting the sections in diaphane. This applies to reagents used for showing the distribution of sizing material on and through the cross sections.

The method of illumination is important. Darkfield illumination with thin sections will show the distribution of fillers when present. The value of polarized light with crossed nicols is questionable, although it may be of service with certain types of fillers.

Figure 3 shows 10μ cross sections with and across the machine direction of a 75% rag content bond paper: *a* shows the unstained sections; *b*, sections stained with a reagent to show the distribution of the starch sizing; *c*, darkfield illumination showing distribution of fillers; and *d*, the same sections with polarized light and crossed nicols. Figure 4 shows 10μ cross sections of stained and unstained onion skin paper cut from a paraffin mount.

Cork Mounts for Partly Prepared Papers

If extremely thin sections are not necessary, considerable time can be saved by mounting partly prepared strips in previously treated corks.

New clean mirrored no. 1 corks are prepared by weighting them to the bottom of a vessel and successively extracting them with 50%, 95%, and 100% ethyl alcohol, and clearing with xylene, the solvent in each case being kept at the boiling point for 30 minutes. This process is repeated, substituting xylene for alcohol. Finally the corks are covered with xylene saturated with paraffin at room temperature, and heated almost to the boiling point for one hour. Then the solution is poured off and the corks are placed on paper towels to dry. The corks may be kept in a wide-mouthed bottle until used.

The paper strips are dehydrated, cleared, and treated in the xylene-paraffin solution as described above, after which they are ready to mount. A longitudinal slit, with the long axis at least half way through one of the previously prepared corks, is made with a razor blade. The strip of paper from the xylene-paraffin solution is inserted longitudinally in the slit as shown in Fig. 5.

The cork and paper are immersed in a bath of melted paraffin for 30 minutes. A dissecting needle stuck into the cork will hold it beneath the surface of the bath. The cork with its imbedded paper is removed from the paraffin, cooled, trimmed, and mounted in the microtome in the same manner that paper is mounted in a paraffin candle (Fig. 1).

In mounting the cork with the paper in the microtome, it should be placed in the object holder so that the slit in the cork is parallel to the jaws of the holder. This prevents the slit from opening because of the pressure on both sides of the cork from the holder.

On a sliding microtome, 15μ sections can be cut by this method of imbedding; with a hand microtome, 40μ to 50μ sections are possible. The cork and paper section is fixed to a slide treated with Mayer's albumen fixative, and the paraffin is removed by solution with xylene; the cork can be removed from the slide by means of dissecting needles, leaving the paper section intact. The section is then placed in a 95% ethyl alcohol bath to remove the xylene, and mounted in diaphane. Figures 6 and 7 show sections of two papers cut by this method.

Cork Mounts for Untreated Papers

For quick sectioning, when only the relative thickness of a coating or the depth of the penetration of printing ink is desired, it is possible to mount the paper strips in previously prepared corks without any pretreatment of the paper. In some instances where the mounting media, the alcohol, or the clearing agent would destroy the character of the paper (e.g., paraffin-coated or rubber-coated paper), it is necessary to use this method, which should be carried out in the following manner. The paper to be sectioned is cut into ribbons as before. Two ribbons of nonmoisture-proof cellophane (across the grain) are cut the same size as the strip of paper. With a razor blade, a slit (longitudinal with the long axis) is made half way through the cork. The paper is placed between the two cellophane strips and inserted longitudinally in the slit. The projecting ends of paper and cellophane are trimmed flush with the ends of the cork, and the whole mounted in the microtome in the manner previously described under the cork method.

By means of a pointed glass rod, a tiny drop of sodium silicate is placed at each end of the waxed-paper section to prevent the separation of the section from the cork during the cutting operation. After the sodium silicate has dried, sections 15μ thick are cut, floated on a drop of water on a slide, placed on a dissecting microscope, and the cork and cellophane removed from the paper section by means of two dissecting needles.

After the paper section has dried, it may be stained; in the case of paraffin papers a 0.25% aqueous

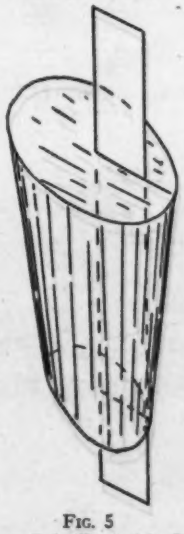
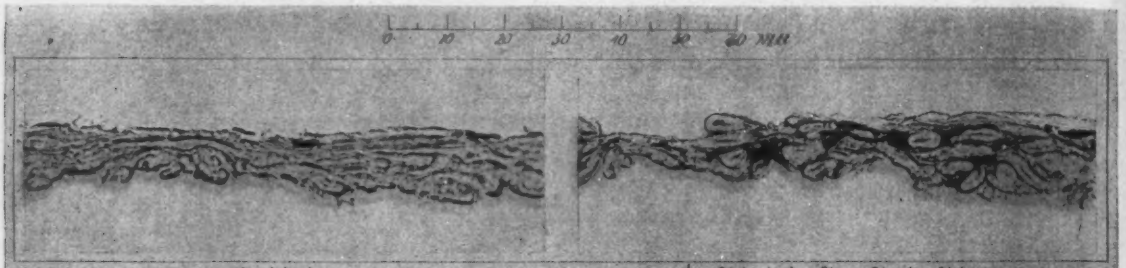


FIG. 5
Paper Strip Mounted in Cork

solution of Crocein scarlet or permanent black ink is used. Within a few minutes, most of the dye is removed from around the section and the remainder carefully blotted up with a piece of filter paper.

The surplus dye should be worked from the slide and removed from the section, after which it is mounted in water. Figure 8 shows cross sections of paraffin papers cut by the method just described, and Fig. 9 shows cross sections of some specialty papers coated with rubber and latex, which were prepared



a. Unstained b. Stained to Show Starch Sizing

FIG. 4 CROSS SECTIONS OF ONIONSKIN PAPER

FIG. 6 CROSS SECTION OF ROTOGRAVURE

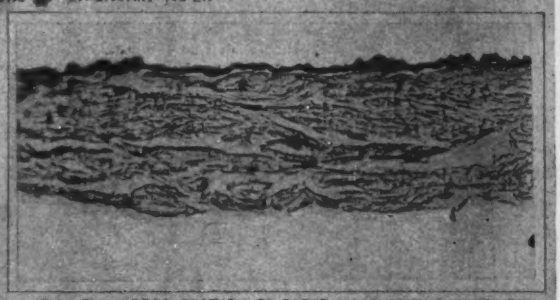
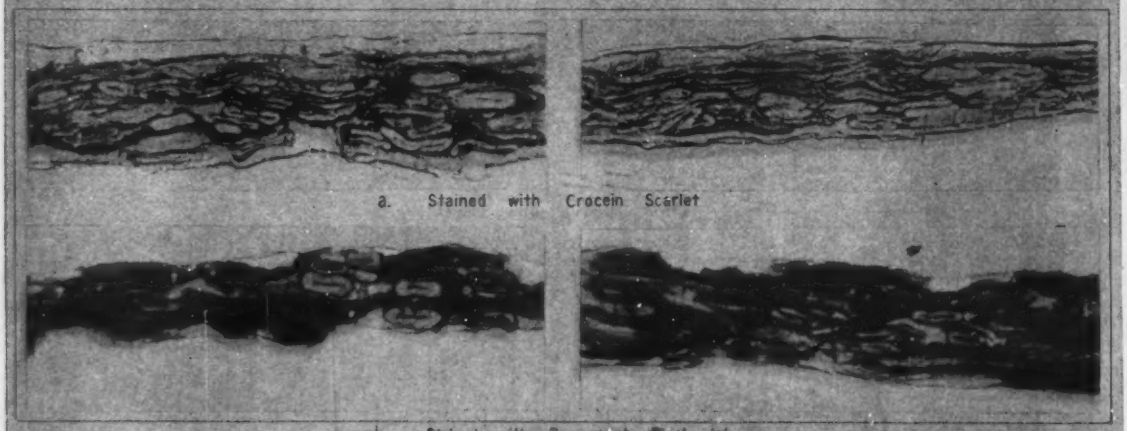


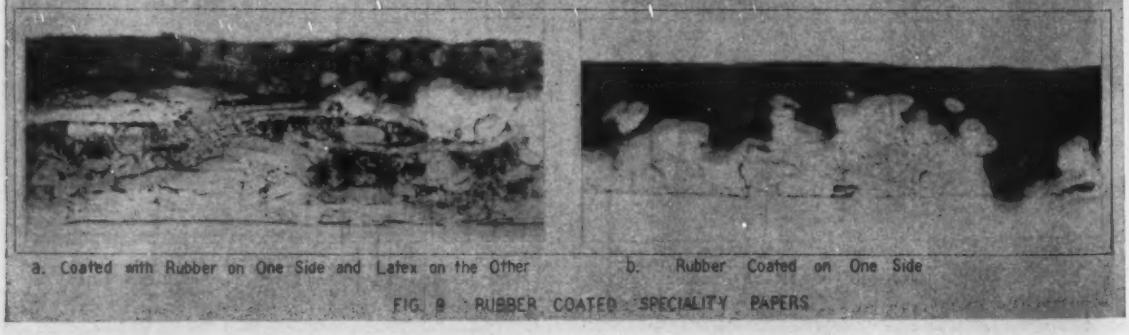
FIG. 7 CROSS SECTION OF PAPER LACQUERED AND PRINTED



a. Stained with Crocein Scarlet

b. Stained with Permanent Black Ink

FIG. 8 CROSS SECTION OF PARAFFIN PAPERS



a. Coated with Rubber on One Side and Latex on the Other b. Rubber Coated on One Side

FIG. 9 RUBBER COATED SPECIALITY PAPERS

FIGS. 4, 6, 7, 8 AND 9

by this method and stained to emphasize the rubber coating.

Celloidin-Cork Method

Experience has shown that when papers for cross sections are mounted in the standard paraffin mount or by the cork-paraffin method, the individual fibers shrink and the thickness of the section expands; therefore, if this is to be avoided or if the sections of papers are already relatively thin so that the mounting media, the alcohol, or the clearing agent would destroy the character of the paper, the celloidin-cork method is the most advantageous.

The paper is cut into ribbons as for paraffin mounts, and dehydrated in acetone. The acetone is slowly heated until it boils and allowed to simmer until air bubbles cease to come from the paper. The strip is transferred from the acetone to a 12% solution of cellulose nitrate (old films) in acetone. This transfer should be made rapidly, before evaporation of the acetone in the paper can occur; the paper should be kept in the 12% cellulose nitrate solution for one to two hours.

In the meantime two rectangular pieces of cork are prepared by cutting a paraffin-impregnated cork (size no. 1 is satisfactory) in half and trimming the sides to form two rectangles, each measuring about 15 by 8 by 2 mm. A coating of cellulose nitrate is spread on one face of each of the cork pieces and allowed to dry.

When the paper strip has soaked in the cellulose nitrate solution for one to two hours, it is removed, one end is clipped in a wooden clothespin, and the paper is allowed to dry for 15 minutes. The strip is immersed in the cellulose nitrate solution a second time (slowly to avoid air bubbles) and again dried for 15 minutes; finally the strip is placed between the cellulose nitrate-treated faces of a cork and held in a clothespin clip while it dries for several hours. If it is allowed to dry overnight, the mount often becomes too hard and brittle, making sectioning difficult.

The celloidin-cork mount is placed in the microtome in the same manner as the paraffin mount and 15μ sections are cut, using a camels-hair brush to reduce rolling. If the paper section splits during sectioning, this may be remedied by moistening the plane surface of the celloidin mount with a small amount of acetone just before cutting.

The section is floated on a small drop of water on the slide and with a little manipulation can be sufficiently flattened; most of the water may be removed with a blotter or filter paper. A drop or two of acetone is placed on the section and, as soon as the celloidin has dissolved, the two cork sections are removed, and the section is mounted in diaphane before all the acetone has evaporated; this reduces the tendency for air bubbles to form within the section.

This method is suitable for sectioning waxed papers, in which case it is not necessary to give the paper the preliminary soaking in the celloidin-cellulose nitrate solution for one to two hours. The strips are simply dipped in the celloidin solution, dried for 15 minutes, and mounted between the previously prepared cork strips. However, the waxed-paper sections can not be mounted in diaphane, as this would dissolve the paraffin; they can be mounted in water, glycerin, or sodium silicate.

Paper samples containing substances such as latex, which might be injured by ordinary embedding methods, can also be embedded by the method just described.

Time Required for Cross Sectioning

Table I shows the approximate time needed for the preparation of the corks and paper strips, candle-making, and the cutting and mounting of the cross sections of paper by the different methods.

TABLE I.—TIME REQUIRED FOR CROSS SECTIONING OF PAPER

Method	Preparation of Cork hr.	Preparation of Paper hr.	Candle-making hr.	Mounting and Cutting hr.	Total Time hr.
Paraffin Mount ...	...	1	¾	2	4
Paraffin and Cork .	2½	1	½	1¼	3
Untreated Paper and Paraffin-Cork	...	...	...	½	½
Celloidin Cork Method	...	2	6	1½	9½

Ranney Water Collector Systems*

By J. F. Rhoades †

Abstract

The underlying principles of the Ranney method of abstracting water from ground are: (1) *The exposure of a large area of water bearing formation to horizontal screen pipes the number and area of which can be extended at will.* (2) *Selective removal of the fine material from the aquifer in the vicinity of screens and the formation of more permeable ground or a gravel pack adjacent to the screen so that each installation consists of a series of radiating drainage channels emptying into a central shaft.* (3) *Access to and independent control of each radial pipe permitting easy backwashing or flushing of every screen section separately. On account of these features and because the horizontal collecting pipes are located for their entire length below the drawdown level of the ground water, Ranney units can be used to develop a water supply at a particular site of a quality and quantity that may not be economically obtainable by conventional methods.*

Where the physical conditions favor the installation of a collector, operating costs in comparison with wells are lower, due to the decrease in the actual pumping head, lesser maintenance charges, and the permanence of productive capacity.

The practicability of building a Ranney collector depends primarily on the hydrogeological conditions of the available sites and the amount and characteristics of the water required.

A completed water collector installation comprises a monolithic, reinforced concrete shaft 13 feet in inside diameter, with 18-inch walls, and a heavy, reinforced concrete plug in the bottom. About four feet above the top of this plug are 1, 2, or 3 rows of

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 16-19, 1942.

† Member TAPPI; Chief Engineer, The Mead Corporation, Chillicothe, Ohio.

8-inch perforated screen pipes, projected out through precast portholes in the shaft wall to a length of approximately 200 feet. Surrounding each screen pipe, is a bed of gravel from 6 to 8 feet in diameter. On the inner end of each of these pipes is a gate valve with a stem extending to the pump house above, so that one or all of the horizontal wells may be closed off at will. Multiple-stage deep-well pumps extend down into the shaft (which is a clear well) to deliver water from the underground reservoir to the water mains.

The first cost of Ranney units is determined by the depth of water-bearing ground, its permeability, the capacity desired, and other factors. Usually the installations cost from $10 to $20 per 1000 gallons per day capacity. Financial charges consist of interest on investment and a low depreciation rate due to the much longer life of the installation. Supervision consists of periodic inspection and control of the functioning of the unit which is practically automatic. As a result the over-all cost of water supplied by Ranney collectors is usually between 0.75 and 1.5 cents per 1000 gallons. This includes all interest, amortization, and operating charges as well as the cost of power for pumping to a working pressure of 50 to 75 p.s.i.

One of the drawbacks to the use of vertical wells as a source of water supply by the larger cities and industrial plants is the number of units required. The operation of each well must be supervised. This results in a larger amount of engineering, and maintenance work. For this reason waterworks engineers seek to reduce the number of operating units in their system to a minimum.

The Collector System

If physical conditions are suitable for Ranney collectors, one collector, because of its much larger screen area, can produce as much water as can be obtained by 10 or more vertical wells located in the same ground.

Concentration of the collection of water at fewer points makes for easier and more economic acquisition of the necessary land and simplifies feeder pipe lines and connections with the mains. Less primary and auxiliary mechanical equipment for a given capacity is required.

The design of the collectors (Figs. 1-4) and their method of construction permits a certain choice of

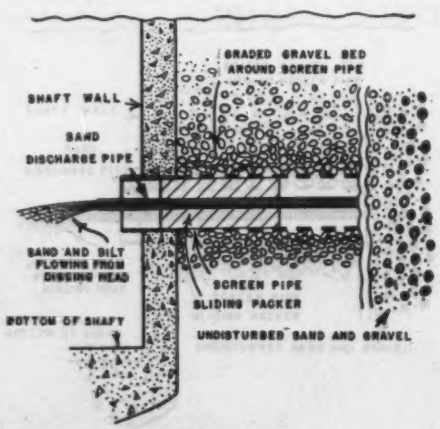

GRADED GRAVEL BED AROUND SCREEN PIPE
SHAFT WALL
SAND DISCHARGE PIPE
SAND AND SILT FLOWING FROM DIGGING HEAD
SCREEN PIPE SLIDING PACKER
BOTTOM OF SHAFT
UNDISTURBED SAND AND GRAVEL

FIG. 1
Projecting a Screen Pipe

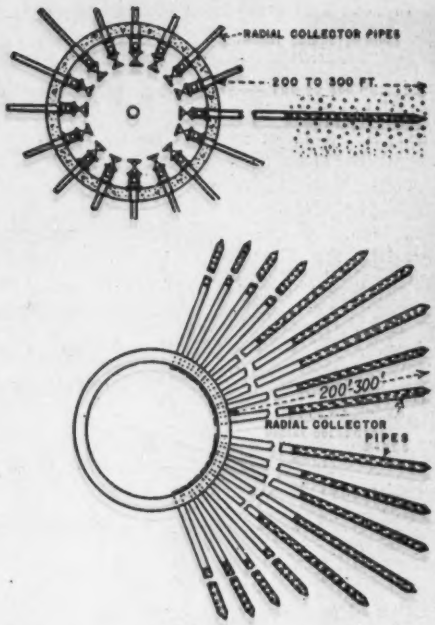


FIG. 2
Cross Section and Plan of Collection Showing Screen Pipes

the geological formation and depth from which water is to be collected. Generally the extraordinarily slow and uniform rate of filtration that can be achieved, results in thorough bacteriological purification. Experience has shown that in some cases the water is softer than that of well at the same location, either because the drawdown being less, a smaller proportion of water is extracted from the deeper strata or because of slower velocities through the ground.

Water Quality

The quantity and quality of water coming from each screen pipe can be measured and tested. This simplifies the establishment of proper rates of filtration and pumping. By the backwashing or blowing of each pipe, which is easily done as a matter of routine, the effectiveness of the natural filter is maintained.

The water being supplied is at all times separated from the equipment and personnel by watertight walls, so that the chances of accidental contamination are even less than in the case of a filter plant. The bacterial content of water produced by Ranney units compares favorably with that of wells or filters.

Maintenance and Operating Facilities

The first requisite for the easy operation of any mechanical equipment is accessibility. The Ranney installations are the only ground-water collectors that provide complete facilities for inspection, maintenance, and reconditioning of all the vital parts. There is no operation, including the replacement of parts of the extension of the original capacity by putting out new screen pipes, that involve the interruption of service of the whole installation for an extended time.

Each screen pipe can be regulated or shut down separately without interfering with the production of the other collecting elements. Remote control of

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the collection and pumping of the water can be provided, should this be desired.

Pumping Economy

Saving in the cost of pumping is achieved through fuller utilization of the natural head (pressure) available and by larger and, therefore, more efficient motor pumping units employed.

The large screen area in contact with the water bearing material results in a correspondingly lower velocity of the water through the screen openings and the ground immediately adjacent thereto. The extension of the collector pipes and radial drains far beyond the shaft also reduces the approach velocity of the water through the aquifer. In consequence, there is little loss of head and the level of the water in the shaft is only a little below that of the water in the ground. The sharp part of the usual drawdown curve (piezometric line) produced by every vertical well is completely eliminated. This alone may mean a basic gain of many feet in the total pumping head, and this saving increases as compared with older wells, since the latter become clogged and incrustated.

As regards pumping equipment, it is obvious that larger pumps and electric motors can be more efficient than smaller ones. The size of the shaft allows larger diameter pump risers. Pump efficiency of 85% can be obtained for the most common conditions of operation. Electric motor efficiencies in the sizes used are approximately 93%. Repairs and replacements of equipment can be done very easily. All electrical equipment and connections are in the dry.

Operation During Floods

The design of the collectors and their great stability, due to the depth of the caisson foundation, permits construction of the housing and access to the shaft well above maximum floor levels. All the operating machinery inside is protected as there is no opening through which raw water can penetrate and the groundwater inlets are controlled by valves. In some cases submersible pumps will accomplish the same results at a smaller cost.

At flood stages there is a larger head over the collecting screens and hence the maximum capacity

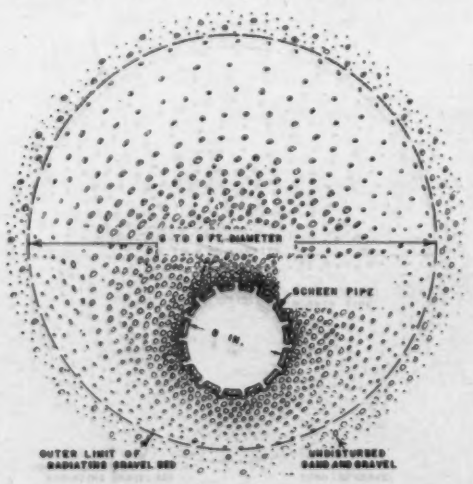


Fig. 3

Cross Section of One of the Radiating, Horizontal Gravel Beds, from Which Sand and Silt Were Removed. Velocity of Water through Screen Openings Is 2/100 of One Foot Per Second. Velocity into Gravel Beds 1/1000 of One Foot Per Second

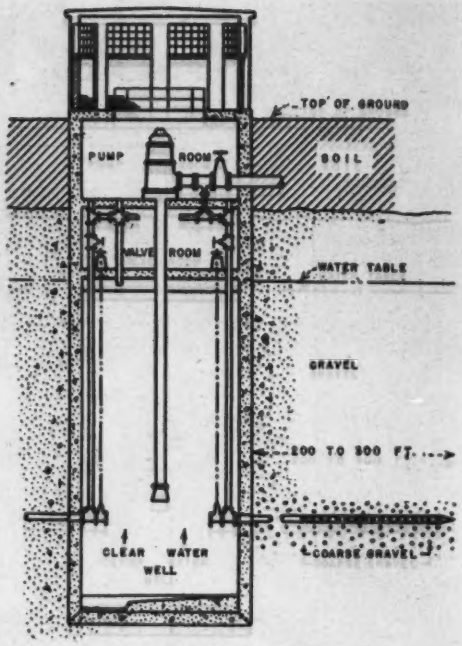


Fig. 4

of the installation is greater. The quality of the water, however, would not be materially changed since the actual rate of infiltration, corresponding to consumption rate, is not altered and always remains under complete control.

The collector is a self-contained water producing system and will operate as long as power can be supplied by overhead or submarine cable, or by an emergency diesel-electric unit that can be located within the collector.

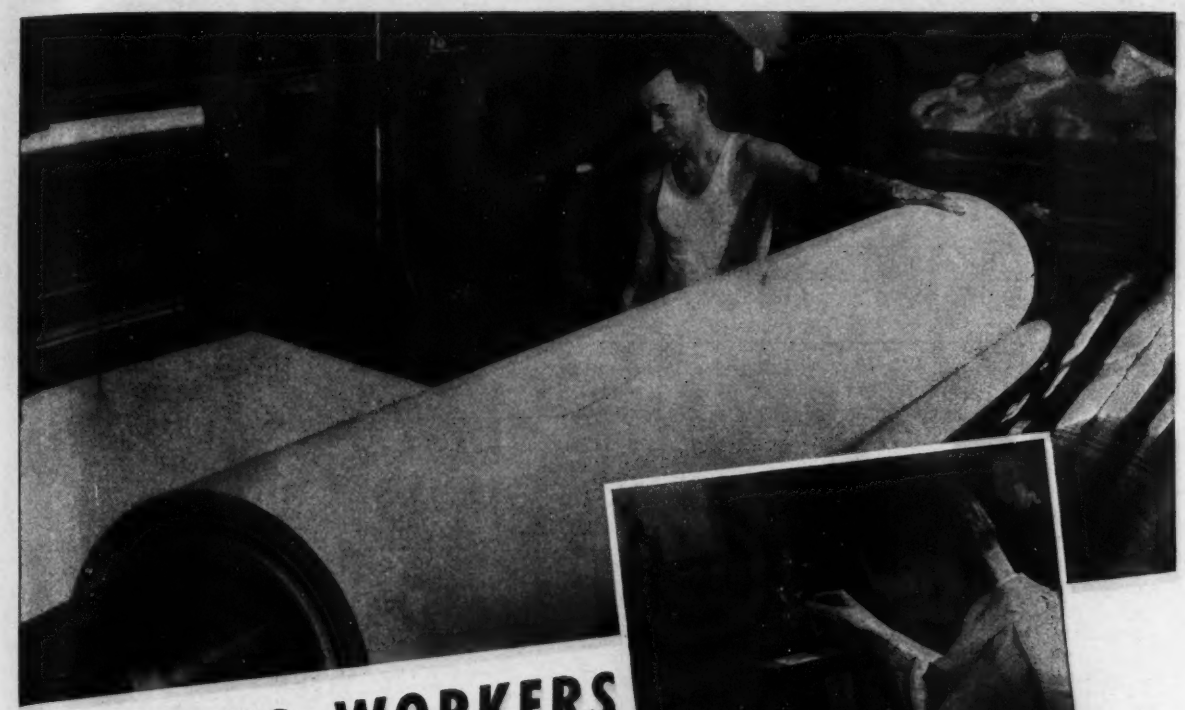
Permanence of Investment in Comparison with Wells

The use of reinforced concrete and heavy iron or noncorrosive metal alloys gives solidity to, and insures the permanence of, collector structures. Full access to the interior of the shaft makes inspection easy and permits any amount of repair work that may be required. New screen pipes can be pushed out through extra portholes left in the walls of the caisson if the original pipes finally deteriorate.

For the usual type of cased screen well, with or without gravel packing, the most common drawback is the short life of the well or of its period of effectiveness which results from one, or a combination of three causes: (1) corrosion, (2) incrustation, and (3) silting up of the ground in the vicinity of the well.

As regards *corrosion*, one of the reasons why vertical wells are frequently affected is the sharp and varying drawdown of the water table, which alternately submerges and exposes the casings and parts of the screens to air. This may necessitate the use of expensive bronze screens. With Ranney collectors the screens are always completely submerged and are made of thick steel plate or of a suitable alloy metal such as stainless steel.

As regards *incrustation*, it has been established



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that the sharp loss of pressure of the water as it passes through the necessarily restricted area of the screen openings of a vertical well and also through the ground in the immediate vicinity, liberates part of the dissolved carbonic gas. As a result some of the dissolved calcium which was in the form of calcium hydrocarbonate precipitates in the form of calcium carbonate. While calcium carbonate does not necessarily represent the largest percentage of the material that encrusts the screen and the adjacent sand, it is extremely important as it serves as the basic binder of the alumina, silica, magnesium, and iron combinations.

Various methods have been devised to remove the incrustations on well screens by the use of acids; however, these are expensive, often harmful and never completely effective. The collectors, by creating no pronounced fall in water pressure, eliminate most of the trouble. Separate access to, and control of each screen pipe, facilitates economical removal of incrustations, should that be necessary.

Silting-up or the clogging of the water bearing material in the vicinity of the screen is of common occurrence in vertical wells. Ranney screen pipes,, however, establish a graduated natural filter through the progressive removal of the fine material of the ground thus the velocity of the water through the aquifer as it approaches the collector increases only gradually and is never large. During the process of installation, or at any subsequent time if desired, the volume of water entering the individual screen pipe is much larger than in regular operation, therefore, no fine particles are entrained during normal rate of abstraction.

Important Adjunct to System

An important and exclusive adjunct to the system is the method of flushing the individual screen pipes. This is effected by closing all but one of the control valves and temporarily lowering the level in the shaft, thus allowing the water to flow for a short time at an accelerated rate through each radial pipe in turn. This can re-establish the original capacity through the further removal of sand or the unpacking of the ground surrounding the screens.

If at some future time, because of unforeseen hydrological changes or for any other reason, it is desired to extend the original screen area or replace it with fresh screens, this can be done by pushing out new screen pipes through the portholes left in the walls of the shaft. Thus the only part of the installation that is subject to physical deterioration or loss in efficiency can be completely replaced at a cost of only a fraction of the original investment.

Economy in Comparison with Surface Supplies

The first cost per unit of capacity of artificial filters, whether of the rapid or slow type and exclusive of the cost of intakes and pipe lines is several times as large as that of the collectors. Frequently dams and reservoirs are required to provide surface water supply developments with the necessary storage capacity during the dry season. Operating costs of filters are high, due to the personnel and also the chemicals required.

Costs

The first cost of Ranney units is determined by the depth to water-bearing ground, its permeability, the capacity desired and other factors. Usually the installations cost from $10 to $20 per 1000 gallons per day capacity. This is for a complete unit including pumps, housing, control apparatus, etc.

Financial charges consist of interest on investment and a low depreciation rate due to the much longer life of the installation. Repair charges are smaller due to reduced number of pumps and the large area of screens which do not have to be washed with acid or replaced. Supervision consists merely of periodic inspection and control of the functioning of the unit which is practically automatic. Consumption of power is less than with other methods for the reasons already mentioned. All of this greatly reduces overall operating costs.

As a result the over-all cost of water supplied by collectors is usually between 0.75 and 1.5 cents per 1000 gallons. This includes all interest, amortization and operating charges as well as the cost of power for pumping to a working pressure of 50 to 75 p.s.i.

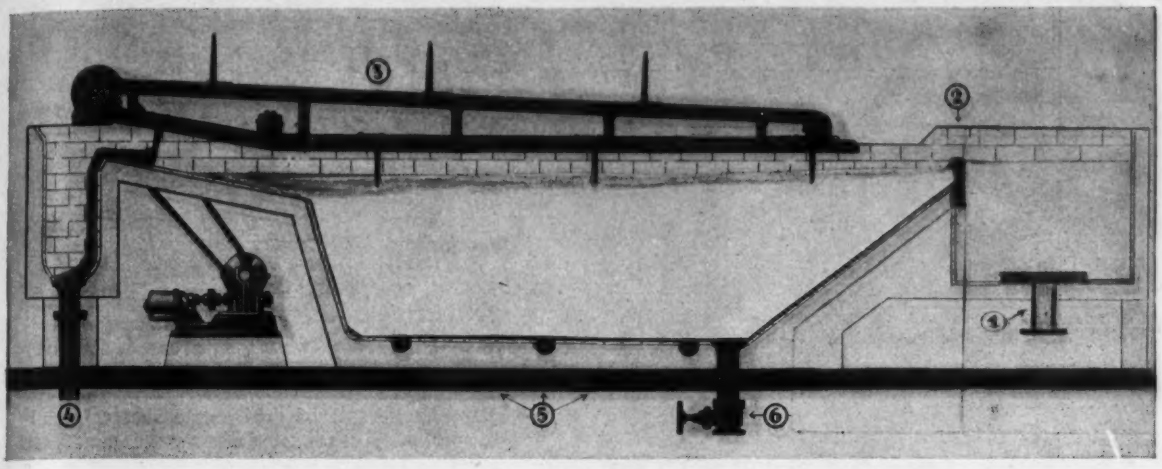
Problems of Vertical Wells

Most of the problems of vertical wells may be summed up in one major or parent problem—i.e., that the effective length of the screen is limited by the thickness of the aquifer. For example, if a water-bearing sand or gravel is only 15 feet thick, it is utterly impossible to sink a vertical screen pipe thereinto with more than 15 feet in contact with the sand body. Of course the collecting circumference of the vertical well can be somewhat increased by building a gravel wall around the screen. Difficulties might never arise if the vertical wells were always pumped at only a small fraction of their capacity—so that the rate of flow through the screen openings would always be kept below 0.03 f.p.s. But, to save the cost of a seeming surplus of wells, this is almost never done. An excessive rate of abstraction causes a rate of flow through the gravel beyond the critical velocity, with the resulting silting up or encrustation of the well screen.

Most water-bearing sands and gravels contain silt, and this silt and fine sand are carried along when the velocity of the moving water passes a critical point; therefore, the rate of flow towards and into the means of abstraction should be as low as possible to avoid sanding up and plugging of the screens.

Where the water is hard, any noticeable reduction of pressure at the point of abstraction may cause a release of carbon dioxide gas, which in turn results in a precipitated deposit of lime, magnesium and iron to form a conglomerate rock that chokes the collecting screens. Therefore, the drawdown in a pumping well should be as little as may be humanly possible.

In a subterranean reservoir where the water is relatively static or where the rate of under flow is very low, each sand grain and gravel stone is surrounded by a film of excessively hard water, in comparison with the water in the center of the pore spaces. If the rate of movement toward the producing well is high, this superhard film is removed from the grains, the effect being to increase the hardness of water produced. When the movement is only a seepage, the hard water film around each sand grain is undisturbed.



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The Advantages of Sulphonated Tall Oil in Manufacturing Coated Paper*

By Edmund Getty[1]

Abstract

In paper coating mill practice, the use of sulphonated tall oil in coating mixes to replace sulphonated castor oil or pine oil has given excellent results in both the ease of coating application and in the quality of the finished paper. Sulphonated tall oil has, from mill observations, certain advantages over sulphonated castor oil when used in relatively small quantities; such as better brushing and a more desirable surface appearance. Sulphonated tall oil has the added advantage that it can be used in relatively large quantities to obtain other desired results. Sulphonated castor oil and pine oil, used in such large amounts would, in many instances, ruin the finished product.

Using relatively large amounts of these oils, in casein-oil coating mixes, laboratory tests showed definite advantages in favor of sulphonated tall oil. In these tests sulphonated tall oil increased the folding endurance and bursting strength of the test sheets. In addition the folding endurance was retained even under extremely dry conditions. Clay-casein coating mixes containing sulphonated tall oil imparted high tear resistance to the test sheets. (All tests were made according to TAPPI Standards.)

The evaluation of plasticizers, eveners, defoamers, etc., in paper coatings has usually been a matter of selecting those that help produce a good, smooth coating application, free from brush marks, pin holes, and other defects.

Both sulphonated castor oil and pine oil if used in excess, can in some instances, impart undesirable characteristics to the finished product. Sulphonated castor oil, because of an uneven penetration, is objectionable in a coated paper, because it causes a mottled appearance in the finished paper and greatly reduces the desired printability or varnishability of the finished paper.

Sulphonated tall oil[2] gave excellent results in mill practice and it seemed to be preferable in the finished paper to sulphonated castor oil or pine oil.

When desired, sulphonated tall oil can be used just as sulphonated castor oil along with pine oil, but the objections already mentioned for sulphonated castor oil are not in evidence.

Laboratory tests were made using large quantities of each of the oils in casein solutions. The tests were made by adding to a 20% casein solution 25% by weight of each of the oils, as received. Emulsions of such a large oil content would, in the case of some oils, probably break when added to a pigment mix, and are not necessarily practical for light coatings; but these emulsions were applied to learn what qualities, in a lesser degree, could be expected when applied to paper coatings. (All physical tests were made according to TAPPI Standards.)

Oil Mixtures

After mixing the casein and oils thoroughly (almost any oil emulsifies readily in a casein solution) the mixture was diluted to the proper consistency for producing approximately 10 pounds per ream (25x 40—500) on one side of the sample sheets. Emulsions of both ammonia and soda ash-cut caseins were made with sulphonated tall oil, sulphonated castor oil, and pine oil.

Test sheets were coated on one side only with casein solutions alone and with each of these casein-oil emulsions. The coated sheets were dried, calendered, and tested after conditioning at 50% and 10% relative humidity.

TABLE I.—AMMONIA-CUT CASEIN
(Sheets conditioned at 50% relative humidity)

Tests	Coating With: Casein Only	Casein & Sulphonated Tall Oil	Casein & Sulphonated Castor Oil	Casein & Pine Oil
Basis Wt. 25x40–500 Raw Stock Lbs.	44.0	44.0	44.0	44.0
After Coating, lb.	55.8	53.9	56.1	53.9
Gloss (B&L), %	64	77	33	84
Brightness (G. E.), %	53.6	46.0	51.4	72.3
Bursting Strength points/lb./ream	0.29	0.38	0.46	0.30
Folding Endurance (M. I. T. 1000 grams) Machine Direction	20	22	66	14
Cross Direction	14	19	64	9
Tear, grams Machine Direction	60	59	42	55
Cross Direction	54	55	38	53

TABLE II.—AMMONIA-CUT CASEIN
(Sheets conditioned at 10% relative humidity)

Tests	Coating With: Casein Only	Casein & Sulphonated Tall Oil	Casein & Sulphonated Castor Oil	Casein & Pine Oil
Folding endurance (M. I. T. 1000 grams) Machine Direction	19	17	47	13
Cross Direction	13	13	45	12

TABLE III.—SODA ASH-CUT CASEIN
(Sheets conditioned at 50% relative humidity)

Tests	Coating With: Casein Only	Casein & Sulphonated Tall Oil	Casein & Sulphonated Castor Oil	Casein & Pine Oil
Basis Wt. 25 x 40–500	54.0	52.6	52.6	55.7
Raw Stock, Lb.	44.0	44.0	44.0	44.0
Gloss (B&L), %	67	55	40	85
Brightness (G. E.), %	53.2	53.3	51.0	75.5
Bursting Strength points/lb./ream	0.33	0.40	0.48	0.29
Folding Endurance (M. I. T. 1000 grams) Machine Direction	25	33	75	25
Cross Direction	12	28	75	10
Tear, grams Machine Direction	59	54	45	56
Cross Direction	58	51	42	53

TABLE IV.—SODA ASH-CUT CASEIN
(Sheets conditioned at 10% relative humidity)

Tests	Coating With: Casein Only	Casein & Sulphonated Tall Oil	Casein & Sulphonated Castor Oil	Casein & Pine Oil
Folding Endurance (M. I. T. 1000 grams) Machine Direction	20	36	86	14
Cross Direction	15	25	39	12

* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 16-19, 1942.

[1] Assistant Superintendent of Coating Mill, West Virginia Pulp and Paper Company, Luke, Md.

[2] A refined tall oil (Indusoil), produced by the West Virginia Pulp and Paper Company.

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The test sheets gave the results shown in Tables I to IV.

These results show no appreciable difference for casein coatings when cut either with ammonia or soda ash when no oil was used, and only a slight advantage for soda ash-cut casein when pine oil was used. When compared with sheets coated with casein only, the sulphonated castor oil-casein emulsion coated sheets show a decrease in gloss, brightness, and tear, and an improvement in folding endurance and bursting strength. These results were obtained using both ammonia and soda ash-cut casein.

Tall Oil and Casein Emulsion

The test sheets coated with sulphonated tall oil-casein emulsion showed a considerable difference in the test results, when the casein cut with ammonia is compared with the casein cut with soda ash. Sheets coated with sulphonated tall oil in ammonia-cut casein show a definite improvement in gloss and bursting strength, some improvement in folding endurance, and a loss in brightness when compared with the results on sheets coated with casein only.

The unusual quality found with the soda ash-cut casein-sulphonated tall oil test sheets is that they show very little difference in folding endurance at 50% relative humidity, as compared with 10% relative humidity. This is a definite advantage, as poor folding under dry conditions is a source of many complaints on coated papers, especially during the winter months.

In these tests sheets coated with sulphonated castor oil and casein, cut either with ammonia or soda ash, although losing some folding endurance, still have, at 10% relative humidity, practically twice the folding endurance of the paper coated with the emulsion of sulphonated tall oil and soda ash cut casein.

However, it is impractical to use sulphonated castor oil in any large quantity, due to mottling and other previously mentioned characteristics. Sulphonated castor oil also lowers the tearing resistance, while sulphonated tall oil retains the tear value very well.

Sulphonated tall oil has, from mill observations, certain advantages over sulphonated castor oil when used in relatively small quantities; such as better brushing and a more desirable surface appearance. Its greatest advantage is that it can be used in large quantities to obtain other desired results when sufficient quantities of other oils to obtain such results would, in many instances, ruin the finished product.

Since the oil content of the coatings used in these tests is large, the results obtained are somewhat questionable. However, this appeared to be one approach for evaluating these oils, and the results do show the type of film to expect in mill practice.

TABLE V.—CLAY COATED SHEETS; 15% CASEIN CUT WITH SODA ASH

(Sheets conditioned at 50% relative humidity)

Tests	Coating With: Casein Only	Casein & Sulphonated Tall Oil	Casein & Sulphonated Castor Oil	Casein & Pine Oil
Basis Wt. 25 x 40–500 Raw Stock Lb.	44.0	44.0	44.0	44.0
After Coating, Lb.	69.5	73.6	73.6	70.5
Gloss, (B&L), %	60	57	57	58
Brightness (G. E.), %	72.7	67.4	58.2	73.7
Bursting Strength points/lb./ream	0.26	0.26	0.27	0.25
Folding Endurance (M. I. T. 1000 grams) Machine Direction	29	16	15	24
Cross Direction	10	15	15	19
Tear, grams Machine Direction	68	76	56	60
Cross Direction	56	60	52	40
Wax Test (Dennison) Stock pulls with Wax No.	9	10	10	5

TABLE VI.—CLAY COATED SHEETS; 15% CASEIN CUT WITH SODA ASH

(Sheets conditioned at 10% relative humidity)

Tests	Coating With: Casein Only	Casein & Sulphonated Tall Oil	Casein & Sulphonated Castor Oil	Casein & Pine Oil
Folding Endurance (M. I. T. 1000 grams) Machine Direction	10	12	10	9
Cross Direction	9	10	9	8
Tear grams Machine Direction	38	48	32	30
Cross Direction	28	30	14	28

The next step was to compare casein with each of the casein-oil emulsions in clay coatings. Each coating mix contained 15% casein on the dry weight of clay. After conditioning and calendering, the results shown in Tables V and VI were obtained on the coated sheets.

The amount of coating applied is considerably above mill practice, and the amount on the sheets containing the sulphonated tall oil and sulphonated castor oil are 3 to 4 pounds heavier than on the other test sheets in this series. The reason for such a heavy application is that the coating had to be kept thick to prevent the emulsion breaking.

The best brushing coating was obtained using casein and pine oil. Sulphonated tall oil-casein was second best, while sulphonated castor oil-casein and casein alone were third and fourth best, respectively.

In the clay coatings, the sheets with casein-sulphonated tall oil compared with the sheets coated with casein only show a loss in brightness and gloss, an increase in folding endurance in the cross direction of the sheet with a loss in the machine directions. The unusual characteristic with the clay-casein-sulphonated tall oil is the extremely high tear compared with other sheets in this clay coating series.

In using sulphonated tall oil, we have experienced the best working coating, and at the same time this material imparts desirable characteristics to the finished paper.

Mill tests with starch as the adhesive and also experimental mill runs with zein as the adhesive, have given more satisfactory results when using sulphonated tall oil than any other similar material.

It must be remembered that a good coating application is usually the principal objective when using such materials as those tested. The quantities used are usually small compared with the quantities we have used in these tests, but in this case we considered it essential to work with large quantities to show any definite characteristics and to prevent giving any results that would be within the limits of experimental error.

Conclusion

While work on sulphonated tall oil in coated papers is really only started, it apparently has certain advantages from mill observation over sulphonated castor oil and pine oil when used in relatively small quantities, and its greatest advantage would seem to be that it can be used in large quantities for some desired results where sufficient quantities of these other oils to obtain such results would, in many instances, definitely ruin the finished product. Since sulphonated tall oil is also much less expensive than sulphonated castor oil, it may be used more freely.

Pulp and Paper Industry in the United States Under Priority Controls*

By John F. Darrow

The priorities system is a flexible, well developed plan designed to aid the Government in purchasing materials and equipment for war. Fully exercised, it places in the Government complete control of production and the regulated flow of all goods. This system has been established because needs have arisen —needs of the war program and needs of the domestic, civilian economy. Not all orders issued under this system, of course, are perfect at their promulgation. Major inequities, however, usually are remedied.

In general, two agencies each have their own priorities control. One is administered by the armed forces, the other by the War Production Board. The pulp and paper industry, since it is not a direct armament industry, is regulated by and concerned with the War Production Board. Indirectly, of course, it is vitally affected by military needs for metals and chemicals, which necessitates WPB regulation.

Rules Governing Priorities

Certain rules have been issued by the WPB (formerly OPM) governing the general administration of priorities. These are known as priority regulations. Briefly, regulation No. 1 defines a defense order and makes its acceptance, under certain conditions, mandatory, while No. 2 implements it. No. 3 abolished the well-known form PD-1, simplified procedure, and gave more power to Government bodies. Its main feature is that under specified conditions, the ratings received by an applicant is extendable. No. 5 pertains to the reproduction of various forms while No. 6, just issued, abolished the critical list.

Let us briefly review the major types of priority orders. First there is the "P" series, as P-1; P-21; P-100. This is a blanket order series, assigning a rating, such as A-10, for certain supplies needed by certain industries. The maintenance and repair order, P-100, is a good example, since we in the industry are familiar with it.

Then there is the "M" series, which directs that certain materials, such as wood pulp, shall or shall not be delivered under certain conditions. The sulphite pulp order is in the "M" series, as will be the new *total* pulp allocation order. Rubber, tin, formaldehyde, and chlorine are also regulated by the "M" series.

The "E" series is very similar to the "T" series, and since it has no direct bearing on the industry, I am passing over it.

Finally, there is the "L" series—L standing for limitations. In this list are the orders curtailing auto and tire production, chlorine used by the pulp and paper industry, and cellophane.

Completing the Picture

To complete our picture, it should be observed that civilian allocation programs, drawn and administered by OPA, often, if not usually, follow these "L" orders. Thus we have allocation of tires, chlorine, rayon, copper, cork and 25 other general items.

Many of you probably wonder what happens to your PD-1's when they are sent either to us for submission to the WPB, or sent direct by you. Frankly, I too sometimes wonder.

These applications are first "cased" by the appropriate division of WPB, which means taking apart the copies, condensing the information for record purposes, giving the application a number and routing it to the appropriate section. At present, all PD-1's are first sent to the unit which has jurisdiction over the applicant's finished product—in our case, the pulp and paper branch. If it is a request for an item containing copper and iron, it is discussed by the pulp and paper branch with those sections. These units must also approve if the pulp and paper section gives it a favorable rating. If the pulp and paper section disapproves, it goes no further.

If all branches approve, you then receive a rating. In this connection I should say that you can save your time and the time of your Government, if you fill out all applications clearly, giving all facts asked for and sufficient other information for the examiner to understand your case. I can say that it is now the policy of the WPB to deny *all* applications for major pulp and paper equipment, except in rare—very rare—instances. It is unfortunate, however, to have an application denied because there is not a sufficient explanation or because the case is poorly presented.

Complete Shutdowns Improbable

In this connection, I should also add that it is very improbable that a large part of the pulp and paper industry ever will be shut down, permanently, because of this war. Some point to English experience, where paper mills now produce less than 25% of former output; where many mills no longer operate. This is an unwise and unfair comparison, since wood pulp and other problems in the United Kingdom are not comparable with those in this country.

I feel compelled to state, however, that many of our mills may be forced to curtail operations, either because their entire output may not be considered essential, or because of power, transportation, labor or other factors. It is my belief that before the year's end, assuming the continuance of the war, that some paper mills will be operating between 10 to 30% below their present level. The best possible plan is for each mill to analyze its output and determine how it can make more paper which is *essential* to a war program. It would be a painful experience to have mills being forced to curtail because their total output was not considered necessary in our all-out war

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effort, when at the same time, a crying shortage for many types of paper existed! Both the Government and industry could be criticized if this occurred.

With your permission, I would like to turn to some of the specific orders issued by the WPB and briefly discuss their applicability to the industry.

The Problem of Rubber

At present, the industry is affected at its very roots by one of our most serious national problems—rubber. We need tires to use on trucks hauling the pulpwood. We must face the fact, however, that our supply from the Pacific—our major source—is eliminated, probably for at least the war's long duration. In 1941, we consumed slightly more than 800,000 tons of rubber for all purposes in this country. While we have a stockpile equal to between 60 and 70 per cent of this consumption, we now produce, synthetically, not more than 20,000 tons. Even if we took the total South American and Mexican output, we still could not obtain more than 35,000 tons. This is why tire rationing is in effect. That is why we are now having some difficulty in obtaining our tires for trucks. However, as you know, we have obtained a minimum of tires to get out the wood in the North during the winter months. This situation, as time goes on, will become more critical. The utmost in tire economy must be practiced by all our mills. if we are to continue obtaining all needed wood.

Closely allied to this is the limitation on truck production. In this instance, we against must practice the utmost diligence in truck care, for we simply are not going to have all—not nearly all—the trucks we would ordinarily need.

Added to these two priority problems in pulpwood is the increasing acuteness of labor supply and the general tightening in transportation.

Operations in the pulp and paper mills themselves already have been affected by priority regulation—and will be more so in the future. However, before passing to the dark side, I would like to say a few words with a silver lining—for silver is not yet under any priority regulation!

It is the present policy of the WPB to keep all pulp mills running, wherever possible. It is also its policy to make available sufficient repair and maintenance items to keep pulp and paper mills in operation. This does not mean, however, that if a fire destroyed a large part of your plant, you could get the equipment to rebuild. You very probably would be closed for the duration.

To Issue Separate Repair Order

In this connection, I can now state that the WPB shortly will issue a separate repair and maintenance order probably P-111 for the pulp and paper, printing and publishing industries. It will take us out of P-100, still giving us an A-10. Its value will be that we will have our own position more clearly defined.

But what have we on the dark side? First of all, we have a limited supply of chlorine, in accelerated demand for war purposes. The industry has cooperated with the Government in planning an orderly retreat on this front. Based upon expected use of chlorine for defense purposes, however, I feel certain that within 5 months very little chlorine will be available for other than slime control, and certain necessary bleaching and processing. Chlorine practically will disappear from our industry, except for needed operating purposes long before the year's end.

Again, the industry ordinarily consumes a large amount of metals and chemicals, as operating supplies, maintenance and repair items, though these are small, in most instances, compared with total United States consumption. For example, we have enjoyed copper pipes, steel plates, and brass valves. We consume iron, steel forgings, alloy and structural steel, lead, monel, tin, mercury, nickel, and a wide range of chemical items from alcohol to zinc sulphite. We use coal, fuel oil, and gas, purchased and manufactured electric energy, and need felts and fourdrinier wires.

It is impossible to discuss all these items I have just mentioned, for even if I were qualified, which I am not, time would not permit. This much I can say, however, each of the aforementioned items, or their basic ingredients, is under some degree of control by the Government. Aluminum, stainless steel, and monel, for all practical purposes, will be denied to the industry for the duration, being strictly controlled for direct defense use only. Steel plate is almost as critical, although the steel section has indicated that a very limited amount of this item would be available, if needed, for the most urgent cause. The position of tin, copper sulphate, rubber, copper, nickel, tungsten, brass, and bronze is nearly as critical.

On the other hand, certain items, while under control or regulation, are still available in limited quantities. I have in mind such items as zinc pigments, wool, shellac, glue, titanium dioxide, sodium sulphite, and sodium silicate.

Position Clearly Defined

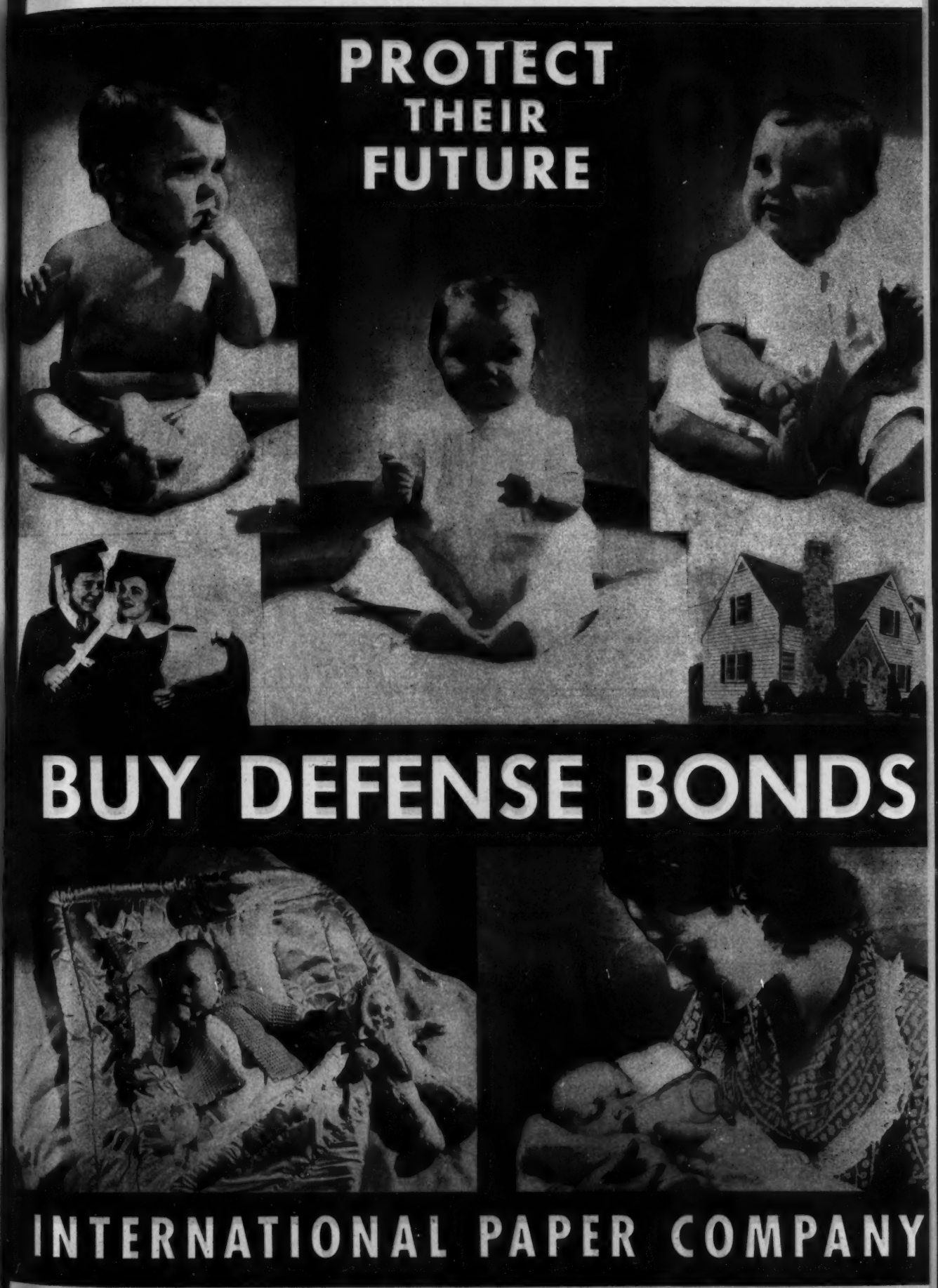
I believe that the War Production Board's policy toward paper machine builders clearly defines our position. The WPB plans to shift paper machinery manufacturers to as much direct ordnance work as possible—as soon as possible. The machinery manufacturers still will make our needed repair and maintenance parts. However, they will not be permitted to build any major equipment, except in a rare instance.

Although copper is critical, we can be assured that, for the present, there will be available copper needed for fabricating fourdrinier wires. We are also assured that wool will be available to us for our felts and that the forthcoming cotton duck order will not affect the availability for dryer felts. The duck order may have to be amended to cover our smaller felts, after its issuance. I feel no apprehension concerning this case.

Since the issuance of the production requirements plan, commonly known as PD-25A, many questions have been raised by various units in the industry concerning its applicability to pulp and paper.

This plan is designed to give a manufacturer priorities assistance to obtain deliveries of scarce materials. This priorities assistance is in direct proportion to his defense orders, or the essentiality of his output to the civilian economy. Primarily, it was designed for manufacturers and fabricators whose raw material was a critical material, such as steel and copper.

On this form the applicant indicates his total volume of orders for a specified quarter. He then indicates the dollar volume of his orders by the preference rating assigned to these orders. In addition, he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presents his estimated raw material needs to fill those orders. The WPB, after careful and thorough examination, then assigns a particular rating for each general class of product manufactured.

Not Widely Used by Paper Industry

This plan has not been widely used by the pulp and paper industry. Actually, less than a dozen mills have made application under this plan since its inauguration last year. To my knowledge, none of these applications have received a rating. Since the major raw materials consumed by the industry are not critical in the sense that their supply cannot be regulated by some other method if necessary, it seems to me that careful consideration should be given by each mill to the disadvantages, as well as advantages, to be derived from filing under this plan. The normal operating supplies, maintenance and repair items needed by the industry usually can be obtained with greater dispatch by methods other than the use of this cumbersome form.

Before closing, I would like to say a few words about pulp and paper itself.

As you all know, we already operate under a sulphite pulp allocation order, M-52, designed to give relief tonnage to the customers of those three mills which, now or shortly, will supply nitrating pulp. The WPB feels that this order is not sufficient. Unless present plans change, therefore, beginning April 1, we will operate under a new order, delegating to the pulp and paper branch, the complete power over all pulp consumed. It is not believed, however, that present circumstances will necessitate the exercise of any actual widespread regulation.

Up to the present, it has not been considered necessary to establish a priorities system for paper. However, this does not mean that priorities cannot be exercised to obtain certain types of paper under certain conditions. Generally speaking, it is illegal for any Government agency to issue a rating to obtain paper. This despite the fact that the Army and Navy have issued numerous preference rating certificates which assign an exceedingly high rating for delivery of paper to a manufacturer working on a contract for the Army and Navy. In practically all cases, these preference ratings, while honored, have been illegal. Within definite, prescribed limits, priorities can be applied to paper.

If the paper is ordered by one of the groups enumerated in priorities regulation No. 1, this order automatically attaches an A-10 rating. This rating applies to paper purchased to be delivered to, or for the account of:

The Army or Navy, Maritime Commission, Panama Canal, Coast and Geodetic Survey, Coast Guard, Civil Aeronautics Authority, National Advisory Commission for Aeronautics, Office of Scientific Research and Development;

The Government of the United Kingdom, Canada, and other Dominions, Crown Colonies and Protectorates of the British Empire, Belgium, China, Greece, the Kingdom of the Netherlands, Norway, Poland, Russia and Yugoslavia.

In addition, any order placed by any agency of the United States Government for delivery to, or the account of, any of these foreign Governments (not individuals), and any countries included in Lend-Lease, also enjoy a defense status.

Finally, under the terms of both priorities Regulation No. 1 and No. 3, any product which is physically incorporated in another product upon which a rating has been assigned, can be obtained by use of a priority rating. For example, if in the manufacture of a certain type of tank, an A-1B rating is assigned, this rating could be extended to obtain insulating paper, if this paper were used in the manufacture of a tank. By the same token, however, the tank manufacturer could not legally use an extension to obtain bond paper or any office forms which he would use in his plant.

It is doubtful if priority ratings will ever be applied, in general, to paper or its products. The philosophy seems fairly well defined that if stringencies arise in certain types of paper, an allocation system is more preferable. In this connection, it might be observed that the WPB has the power to allocate or control the manufacture of paper. The Office of Price Administration, however, is the only agency having the legal authority to ration the end use of this paper. Specifically, the WPB can allocate the output of wrapping paper mills. After the war needs are met, however, the Office of Price Administration has the power to determine what types of consumers would obtain the remaining amount of paper bags. I should add here that this is a hypothetical case, and does not represent any definite plan of either the WPB or the OPA.

Full Implications Not Realized

Gentlemen, there is one thought I would like to leave with you. This country is at war . . . the chips are all blue. We must win, using our total resources to do so. I am fearful that many in the industry still fail to recognize the full implications of this world-wide struggle. Requests still come to the WPB seeking materials which cannot and should not be granted. It is my firm conviction that all mills in our industry, as well as all other industries, would do their country and themselves a vital service if they attempted to operate now with a minimum of scarce materials. Many substitutes, or repairs, can be made, which, while not as practical, will serve the purpose. This already has been done by numerous mills. All industries, like ours, must look ahead to the not too distant future when they may be without power for a day or week; without certain needed operating supplies; without sufficient man power. All must substitute and conserve as much as possible—and then more besides. There can be no chiselers—for a few individuals, attempting to loot limited reserves, could bring the wrath of the Government upon the entire industry. We cannot and will not have it said that our industry has been responsible for the loss of one soldier, because it wastefully used its materials.

Jones Salesmen Discuss War Problems

Sales and production problems brought about by the tremendous war requirements for transmission products came in for careful study at a two day conference of the W. A. Jones Foundry and Machine Company, national sales force and factory executives held at the Palmer House in Chicago on January 15 and 16, 1942.

The place of the sales organization in rendering important services to the trade in connection with proper application and use of products as well as in checking deliveries, was stressed at the conference.

The Physical Testing of Paper, 1940–1941*

By B. W. Scribner[1]

This resumé of developments in the physical testing of papers is one of the reports contributed annually by the Chairman of the Paper Testing Committee. The annual report formerly covered the entire field of paper testing but is now largely confined to physical testing as reports of developments in testing related to optical, printing and chemical properties, and to microscopy and bacteriology are now prepared by the chairmen of the respective committees dealing with these subjects. This report covers the period November, 1940, to October, 1941, inclusive.

Schopper described a "torsional strength tester" which effects a marginal tear *(1)*. A device developed by J. M. Finch for use in determining wet tensile strength was described *(2)*. The Institute of Paper Chemistry reported the results of a study of the Thwing "initial tear tester" *(3)*.

Several articles relating to permeability were published. Brecht and Liebert studied the applicability of various methods for the determination of the reaction of papers to writing ink *(4)*. Lafontaine investigated the use of the angle of contact test for this purpose *(5)*. Hicks and Mellor found the use of a solution of gelatin in determination of water vapor permeability to be advantageous *(6)*. For the same purpose, Leach described a glass bulb made in two parts which have the test specimen clamped between them. One part contains a solution which gives a low relative humidity and the other part has an atmosphere of high humidity *(7)*. Poulter devised a photoelectric instrument for measuring the rate of permeation of oil from decrease in opacity *(8)*.

Agahd described a sheet-formation testing device by which the sheet is scanned for transmission of light *(9)*. A brief description of the Gurley-Witham curl and shrinkage instrument was published *(10)*. Relative to a revision of the TAPPI method for conditioning paper, Carson presented data showing the necessity of standardizing the conversion of wet- and dry-bulb readings to relative humidity, together with a chart prepared for use with the revised method *(11)*.

In the documentary field, descriptions of methods for testing the stability of cellulose acetate sheeting and papers laminated with it are included in an article by Scribner *(12)*. Various methods of deciphering charred documents were described by Taylor and Walls *(13)*, by Murray *(14)*, and by an anonymous writer *(15)*.

The following articles relate to tests devised for testing specific paper products. In the testing of fiber containers, Quinn described a procedure for finding the bursting strength of the creased edges *(16)*; Drewson discussed the status of stiffness testing *(17)*; in a discussion of the permeability of containers to water vapor, Emley mentioned the need of testing methods for finding the permeability *(18)*; and Quinn in another article described a simple device for testing the water resistance of fiber container boards *(19)*. In discussing the testing of paper as wrapping material for glass, Burgstaller stated that the Bekk scratch tester is suitable for testing for scratching particles, but that an actual contact test is the only reliable test at present for finding whether the paper will cause blooming of the glass *(20)*. In articles dealing with fiber building boards and other insulating materials, Schulze described testing procedures used for finding their resistance to rot, molds, and insects *(21)*, and Metz and Seekamp described apparatus for measuring the fire resistance of such materials *(22)*. Noble presented a survey of methods utilized in the quality control of thermoplastic coated and waxed papers and stressed the need of more adequate methods *(23)*. Various methods for testing electrical pressboard for serviceability were described by Brecht and Schröter *(24)*. Carson and Worthington discussed the testing of currency paper for wearing quality. They developed a crumpling device for the purpose and found that testing for air permeability after crumpling was the most useful means for measuring the breakdown of the paper structure *(25)*. Davis and Meeland reported results obtained in evaluating blueprint papers by the sensitometric method *(26)*.

A discussion of the most common physical and microscopic tests used in France was prepared by the Association Francaise de Normalisation (Afnor) *(27)*. Larocque gave a report of the activities of the Committee on Physical and Chemical Standards, Technical Section of the Canadian Pulp and Paper Association, for 1940 *(28)*. Korn presented a review of developments in general in paper testing during 1938 and 1939 *(29)*. Scribner gave his annual report of this kind for 1939-1940 *(30)*, and also the annual report of the activities of the TAPPI Paper Testing Committee *(31)*. In the latter report covering the past year, which will probably be published in the near future, many new, revised, and corrected TAPPI methods are listed as now being available in the standard loose-leaf form.

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* Presented at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 16-19, 1942.

[1] Member TAPPI; Chairman, TAPPI Paper Testing Committee; Chief of Paper Section, National Bureau of Standards, Washington, D. C.

To Start "Salvage for Victory"

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 16, 1942—A program to mobilize the nation's 1,700,000 retail stores in a continuing drive to salvage materials needed to produce weapons for America's fighting men has been launched by the Bureau of Industrial Conservation of the Office of Production Management.

Merchants in all sections of the country are being asked to sign pledges that their stores are saving waste paper, scrap metal, old rags, rubber and other materials urgently needed for our country's all-out war effort. Those signing the pledges earn the right to display window emblems signifying that they are taking part in the "Salvage for Victory" program.

Cooperation of retail stores in the bureau's nation-wide salvage effort is considered one of the most important aspects of the over-all program to return to war industries all previously wasted or idle materials. Through State and community salvage committees, now being set up throughout the country as part of local defense councils, the bureau is appealing to the general public to collect and dispose of waste materials in homes. Persons wishing to sell their collections are advised to notify local junk dealers, while those who prefer to give their waste may donate it to any one of a number of charitable agencies which collect such materials.

"Countless thousands of tons of these materials, now going to waste, can, through the cooperation of America's stores, be put to military use to defeat the aggressor nations," said Lessing J. Rosenwald, chief of the Bureau of Industrial Mobilization.

Instructions on the most effective procedure to follow include these suggestions:

"Go through your store today and gather up all waste materials and discarded equipment you are no longer using.

"Appoint one of your employees to supervise the regular collection and disposal of waste materials in your store.

"Sell all these to a waste material collector or give to a charity, school, or other organization collecting them."

Pledges are now being mailed. Upon their return to the Bureau, stores will be sent window emblems containing the message: "This store is helping make weapons from waste by salvaging waste paper, old rags, scrap metals, old rubber."

As the first step in getting reclaimable waste to America's war factories, store owners are urged to clean out their storage rooms and basements. Thereafter, they are requested to see that the day-by-day accumulation of waste continues to flow from their stores in a steady stream.

In the salvage of waste paper—badly needed to make new paperboard to wrap war materials—it is suggested that cartons, boxes and paper bags be flattened and tied in large bundles; newspaper should be piled separately.

Rags, metals—iron, steel, brass, copper, aluminum, lead, etc.—and rubber—old automobile tires and inner tubes, rubber overshoes, etc.,—should be segregated in boxes or bags.

Stores which do not receive pledge cards within the next few weeks are requested to send a card to the Bureau of Industrial Conservation, Office of Production Management, Washington, D. C., and one will be mailed immediately, it was said.

N. E. Paper Merchants Meet

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., February 9, 1942—Harry J. Dowd, H. J. Dowd Company, Cambridge, Mass., was elected president of The New England Paper Merchants Association, Inc., at the annual dinner meeting of the organization at the Parker House Wednesday evening. Other officers elected were: First vice-president, J. Frank Halloran, Century Paper Company, Boston; Second vice-president, James C. Campbell, Industrial Paper & Cordage Company, Pawtucket, R. I.; treasurer, Frank B. Cummings; secretary, F. Bendel Tracey, Fort Hill Paper Company, Boston. Board of directors: John F. Blackman, D. F. Munroe Co., Boston; John H. Brewer, Storrs & Bement Company, Boston; Charles A. Esty, Carter, Rice & Co., Corporation, Boston; Samuel N. Ginsburg, Ginsburg Bros., Inc., Somerville, Mass.; Leon M. Poore, John Carter & Co., Inc.; Robert N. Stone, Stone & Forsyth Company, Boston; William H. Walpole, Rutter & McNaught, Inc., Boston; Sterling R. Chatfield, Minotte E. Chatfield Company, New Haven, Conn., Connecticut representative; John R. Whitney, Whitney-Anderson Company, Inc., Springfield, Mass., Western Massachusetts representative; Harold R. Robinson, C. H. Robinson Paper Company, Portland, Me., Maine, New Hampshire and Vermont representative.

With President Charles A. Esty, Carter, Rice & Co., Corporation, in the chair, it was the largest attended meeting of its kind held by the association in the last five years, showing the sound condition of the organization.

The treasurer was authorized to purchase a $1,000 Defense Bond from the funds of the association.

The following were elected to represent the association on the board of directors of The National Paper Trade Association of the United States, Inc., for one year starting March 1, 1942: Fine Paper Division, John H. Brewer, Storrs & Bement Company; alternate, John R. Whitney, Whitney-Anderson Paper Company. Wrapping Paper Division, Floyd H. Blackman, D. F. Munroe Company; alternate, James C. Campbell, Industrial Paper and Cordage Company.

It was announced that the following had been elected to membership recently: United Paper Company, Attleboro, Mass.; Howard Paper Company, Boston, and Malone Bros. Company, Chelsea, Mass.

Walter R. Guild, executive secretary, announced that there had been an increase of 30 per cent in the membership of the association during the last three months.

In addition to reports from the officers and remarks from J. H. Brewer, the National Vice-President, Victor Coen, English barrister, delivered an address on "Air Raids in London."

District meetings in Springfield and Providence are planned for the early future.

OPA Waste Paper Prices

The OPA Amendment No. 5 to Price Schedule No. 30 on waste paper, now in effect, sets the following maximum or ceiling prices per short ton; new corrugated cuttings, $21.50; old corrugated containers, $20; and No. 1 news (formerly No. 1 baled news) $15.

Obituary

E. B. Redford

[FROM OUR REGULAR CORRESPONDENT]

WISCONSIN RAPIDS, Wis., February 16, 1942—E. B. Redford, secretary of the Consolidated Water Power and Paper Company, died Saturday morning, February 7, at Kahler Hospital, Rochester, Minn., following an operation performed January 27 from which he apparently was recovering. Complications set in, rendering his condition critical.

Mr. Redford was born July 20, 1878 at Oshkosh, Wis., and was 63 years old. He began his business career in 1897 as a teller at the National Union Bank at Oshkosh, going from there in 1904 to Wautoma, Wis., to become cashier of the First National Bank. Two years later he moved to Grand Rapids, Wis. (now Wisconsin Rapids) to become cashier of the Bank of Grand Rapids, until its later merger with the First National Bank.

Mr. Redford was elected secretary-treasurer of the Consolidated company in September, 1916, and held that position until his death. He continued his active banking career until 1921, and has since served as a director and vice-president of the First National Bank. He was also a director of the Prentiss-Wabers Products Company, secretary-treasurer of the Consolidated Water Power Company, and secretary-treasurer of the Newago Timber Company, Ltd. The latter two are subsidiaries of Consolidated Water Power and Paper Company.

Active also in community circles, Mr. Redford was a member of the Masonic and Elks lodges and of the Rotary Club. He was prominent in war work during the first World War, and in 1917 was chairman of a committee which raised funds to construct Riverview Hospital.

He is survived by his widow, the former Helen T. Spalding whom he married in 1938, and one son by an earlier marriage, John M. Redford, attorney, of Milwaukee, Wis.

Funeral services were held Tuesday afternoon, February 11, at the Baker Mortuary at Wisconsin Rapids, with a large attendance and many floral tributes.

William G. Shortess

William G. Shortess of 706 Hillcrest Road, Ridgewood, N. J., a paperboard manufacturer whose plants extended through many Eastern States, died February 5 in Le Roy Sanitarium after a brief illness. He was 70 years old.

Mr. Shortess was president of the Federal Paper Board Company of Bogota, N. J.; Windsor Paper Mills, Inc. of New York; Inland Paper Board Company of Versailles, Conn., and the Midvale Paper Board Company of Hudson, N. Y. He also headed the Acme Paper Board Company, with plants at Reading Pa., and Whitehall, Md., and the Liberty Paper Board Company of Steubenville, Ohio.

He leaves a widow.

Fremont M. Johnston

APPLETON, Wis., February 16, 1942—Fremont M. Johnston, who was affiliated with Appleton Woolen Mills for twenty-five years, died Sunday afternoon, February 8, at his home here after a brief illness.

Mr. Johnston was 80 years old, and was a pioneer settler of Appleton, where he was born, July 23, 1861. He began work with Appleton Woolen Mills in 1905, and retired twelve years ago. Since that time he had been growing cut flowers for the Chicago market. He had been a member of the Masonic order for more than fifty years, and was a member of the First Congregational Church.

Survivors include the widow; one daughter, Mrs. W. C. Kennicott, Glenview, Ill.; three sons, Alden M. and W. Henry Johnston, Appleton, and F. Faville Johnston, Madison, Wis.

William H. Howe

William H. Howe, paper manufacturer for fifty-three years, with interests in the United States and Canada, died February 4 after a week's illness. He was 71 years old.

He was president of the Hubbs & Howe Co., Buffalo; president of the Anglo-American Paper Company, Ltd., Merriton, Ont.; vice-president of the Hubbs & Hastings Paper Company, Rochester, and director of the Interstate Cordage and Paper Company, Pittsburgh; the Victoria Paper and Twine Company, Ltd., Toronto; the Canadian Vegetable Parchment Company, Ltd., Merriton, and the Garden City Tissue Mills, St. Catherines, Ont.

L. W. Sutherland Resigns

KALAMAZOO, Mich., February 17, 1942—Resignation of Louis W. Sutherland as president of the Sutherland Paper Company, which he founded with his brother 25 years ago, was announced today.

Mr. Sutherland, one of the leaders in the paperboard and container industry in the United States, submitted his resignation to the board of directors at its annual meeting Monday afternoon, following an annual meeting of the company's stockholders.

The resignation was accepted, and Mr. Sutherland immediately was elected chairman of the board, a newly-created post.

Named by the board to succeed him as president of one of the three largest concerns of its type in the United States was Robert E. Rutledge, 49-year-old one-time school teacher who has been with the company since 1928, the last two years as executive vice-president. Mr. Rutledge was employed as a salesman when he joined the company in October, 1928, after one and one-half years with the Mac-Sim-Bar Paper Company, Otsego.

Mr. Sutherland's report to the stockholders Monday afternoon indicated the company, in his last full year as president, had experienced by far its most successful 12-month period.

All directors of the company were re-elected at Monday's shareholders' meeting, and all officers with the exception of Messrs. Sutherland and Rutledge were named to continue in the same capacities in 1942.

Glen E. Graham and A. J. Young are vice-presidents, and William L. Race is secretary-treasurer. Members of the board, in addition to Messrs. Sutherland, Rutledge, Graham, Young, and Race, are E. W. Chase, L. M. Crockett, Dr. L. H. S. DeWitt, F. B. Eilers, Charles H. Farrell, O. F. Miller, Walter L. Otis, and E. A. McQuade, New York City. The office of executive vice-president, held by Mr. Rutledge until Monday's meeting, was discontinued.

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending February 18, 1942

	High	Low	Last
A. P. W.	....	....	....
Armstrong Cork Co.	24¼	23⅛	23½
Celotex Corp.	7⅜	7⅛	7⅛
Celotex Corp., pf.	70	68	70
Certain-Teed Products Corp.	2	1⅞	1⅞
Certain-Teed Products Corp., pf.	26¼	26	26⅛
Champion Paper & Fibre Co.	16⅜	16¼	16¾
Champion Paper & Fibre Co., pf.	100	100	100
Congoleum-Nairn Co.	15⅞	15½	15½
Container Corp. of America	12¾	12	12
Continental-Diamond Fibre Co.	7¾	7⅝	7⅝
Crown-Zellerbach Co.	11⅜	11	11⅛
Crown-Zellerbach Co., pf.	83	81	81
Flintkote Co.	10	9⅝	9⅝
Robert Gair	1⅜	1¾	1⅞
Robert Gair, pf.	10	9¾	10
International Paper Co.	14⅛	13¾	13½
International Paper Co., pf.	57¾	56¾	57¼
Johns-Manville Corp.	58	55	57
Johns-Manville Corp., pf.	123	122	122
Kimberly Clark Corp.	27½	27½	27½
MacAndrews & Forbes	20¾	20⅜	20⅜
MacAndrews & Forbes, pf.	....	....	....
Masonite Corp.	27½	26½	26½
Mead Corp.	6½	6¼	6½
Mead Corp., pf.	70⅛	69	69
Paraffine Companies, Inc.	25	23¾	23¾
Paraffine Companies, Inc., pf.	....	....	....
Rayonier, Inc.	10	9¾	9¾
Rayonier, Inc., pf.	25¼	25	25
Ruberoid Co.	17	16¾	16¾
Scott Paper Co.	33½	32¾	32¾
Scott Paper Co., pf.	108½	108	108
Sutherland Paper Co.	18	17⅜	17½
Union Bag & Paper Corp.	9⅛	8½	8⅜
United Paperboard Co.	3⅞	3⅜	3⅜
U. S. Gypsum Co.	45¾	43½	44½
U. S. Gypsum Co., pf.	172	170¼	170¼
West Virginia Pulp & Paper Co.	17	16½	16½

New York Curb Exchange

High, Low and Last for the Week Ending February 18, 1942

	High	Low	Last
American Box Board Co.	....	....	....
Brown Co., pf.	....	....	....
Great Northern Paper Co.	....	....	....
Hummel-Ross Fibre Corp.	4¾	4⅝	4⅝
National Container Corp.	....	....	....
St. Regis Paper Co.	2¼	2	2
St. Regis Paper Co., pf.	....	....	....
Taggart Corp.	3	3	3

Bartgis Bros. Show Big Increase

E. H. Lupton, president, in submitting his annual statement to the stockholders of Bartgis Brothers Company in part said:— "Net sales totaled $1,290,-276.46 which is approximately 39% increase over 1940. The net income after all charges (depreciation and maintenance charged against operations amounted to $88,170.65) but before deducting Federal and State income taxes amounted to $231,404.14. After deduction of all charges and Federal and State income taxes the net income amounted to $121,588.70. Preferred dividends amounted to $10,958.99 leaving $110,629.71 equal to $1.02 per share on the 108,052 common shares outstanding on December 31st, 1941. This compares with 38c per share in 1940, 52c per share for 1939, 51c per share for 1938 and 77c per share for 1937 on the same number of outstanding shares. Preferred dividends have been paid regularly and common stock dividends were paid to the amount of $16,207.80 during the year.

"The tons of paperboard produced in 1941 were 16,408 tons, of which 15,973 tons were converted into folding cartons. We produced 14,632 tons in 1940, 16,665 tons in 1939, 15,231 tons in 1938 and 14,320 tons in 1937. The 1941 average gross sale of finished board was $78.64 per ton as against $63.42 per ton for 1940, $57.25 per ton for 1939, $51.94 per ton for 1938 and $55.25 per ton for 1937.

"The net profit before all estimated Federal and State income taxes for 1941 per ton of board produced was approximately $14.10 per ton compared with $4.89 per ton in 1940, $5.10 per ton in 1939, $5.22 per ton in 1938 and $9.75 per ton in 1937.

"During the year before the present national emergency our directors voted to expand our plant facilities, requiring capital expenditures over a period of months running well into 1942, of approximately $475,000.00.

"The installation of this equipment now well under way includes a new boiler plant, and an additional 118 inch cylinder board machine, beaters, jordans, chests, screens and other equipment necessary for the manufacture of from 75 to 100 tons per twenty-four-hour day of the better grades of folding boxboard. The financing for these capital expenditures has been amply and economically provided for, part from earnings and the balance by an unsecured bank loan of $200,000.00 maturing over a period of five years.

"This expansion when fully complete will step up our present production by about 140% and will make this company one of the larger integral units in the folding box and carton industry."

Hinde & Dauche Net Higher

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., February 16, 1942—Hinde & Dauche Paper Company of Canada, Ltd., reports for the year ended December 31, 1941, net profit of $500,-202, after all charges, including bond interest, depreciation, taxes, etc., equal to $1.67 per share on 299,-933 shares of common stock outstanding. This compares with net profit of $415,589 or $1.39 a share in the previous year.

Bird & Son Doubles Net

For the year ended December 31, 1941, consolidated net profits of Bird & Son, Inc., was $1,195,-695, equal after preferred dividends to $1.92 a common share. This compares with 1940 profit of $631,-005, equal to 92 cents a common share.

As of December 31, 1941, current assets were $8,880,146, and current liabilities $1,950,497. Comparable 1940 year-end figures were $7,649,978 and $1,007,537, respectively. Consolidated net sales increased 30 per cent.

Union Bag Earns $2,168,313

The Union Bag and Paper Corporation reports for 1941 net earnings of $2,168,313, or $1.70 a capital share, compared with $2,134,391, or $1.68 a share in preceding year.

K.V.P. Nets $833,995

The Kalamazoo Vegetable Parchment Company reports net income for 1941 of $833,995, equal to $1.67 a share on 500,000 common shares, compared with $586,558, or $1.17 a share, in 1940.

The Sandy Hill
SELECTIVE DRIVE
(PATENT APPLIED FOR)

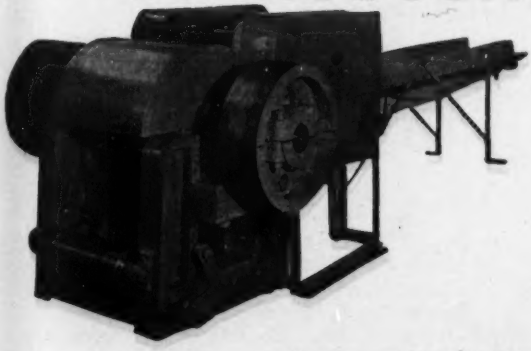
The answer to the demand for better, simpler paper machine drives because:

1. It is accurate.
2. It makes possible the following reduction in costs: Capital Investment through elimination of basement, Floor Space, Friction Load (Power), Lubrication, Maintenance, Shutdowns, and Man-Hour Supervision.
3. It locates the variable speed line shaft conveniently right on the floor back of the paper machine.
4. It eliminates the necessity of a basement, a mezzanine floor, or an overhead line shaft.
5. It is economically justified in steadier, smoother paper production.
6. It permits over twice the adjustable draw range of the standard cone pulley set-up, and makes possible a much finer adjustment than on the average drive, thereby greatly reducing strains and breaks.

"Compact and Accessible"

Sandy Hill
IRON & BRASS WORKS
PAPER MACHINERY SPECIALISTS HUDSON FALLS, N. Y.

CUTTERS ARE DOING THEIR PART IN PRODUCTION FOR VICTORY



Taylor-Stiles Cutters are standard equipment in all mills using hard stock, from manufacturers of the finest writing and bond papers to felt building and roofing.

NO. 11 "MULTIPLEX" CUTTERS

have a capacity of up to 3 tons of rags an hour. Every detail of design and construction is studied to increase their efficiency and reduce cost of operation and power consumption.

Write for information about the type for the work you must do.

TAYLOR-STILES & COMPANY
BRIDGE STREET - - - - RIEGELSVILLE, N. J.

Get increased return from MONORAIL Equipment

TIME studies obtained after installation of overhead handling equipment often reveal definite reductions in costs. Mechanical methods provide low cost movement of goods and release skilled labor for profitable production.

Compact electrification together with the many exclusive control features of the American MonoTractor, permit the application of automatic equipment to handling problems in nearly every industry. Costs are reduced in direct proportion to the number of man-hours saved.

Let an American MonoRail engineer explain the possibilities of an overhead handling system in your plant. No obligation, of course.

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Paper Making Revised

The late George S. Witham, Sr., had almost completely finished the task of revising his popular practical treatise, "Modern Pulp and Paper Making" when he died in June, 1937. The work of revision was completed with the assistance of his son, George S. Witham, Jr., himself a well-known papermaker, and various close friends throughout the industry.

George Witham, Sr., had spent his whole life in the paper industry. To that fact may be attributed the peculiar merits of his treatise. It was the first book to deal with pulp and papermaking as actually carried on in America. The books previously available were largely based on English practice which in many respects is entirely different.

Also, Mr. Witham went to great pains to explain a multitude of practical details. He was anxious to help young men who were striving to get along in the industry. In fact, that was his principal motive in writing the book. He had, himself, risen from humble beginnings as an unskilled laborer to some of the most responsible positions in the industry. He got his early training in various mills in Maine ending with the managership of one of the largest mills of the Great Northern Paper Co. After that he was for many years Manager of Mills of the Union Bag and Paper Co., in charge of operations at all their various plants. After retiring from that position, he served many important paper manufacturing concerns as consultant, and in several cases took complete charge of the modernization and improvement of unprofitable plants, in which type of work he was a most conspicuous success.

Throughout Mr. Witham's career he was an inventor, having taken out more than a hundred patents on various improvements in papermaking equipment, many of which are in most extensive use today.

In addition to his practical treatise, "Modern Pulp and Paper Making" he was also author of many papers for technical periodicals and also compiled the International Correspondence Schools course on papermaking.

The second, completely revised edition of his treatise, which has just been published, fittingly crowns a lifetime of achievement in the paper industry.

Shortage in Woods

What will happen to the pulpwood harvest this winter in the woods of northern Wisconsin and upper Michigan is a conjecture. With the demand heavier than ever before to meet production demands, operators are concerned over an acute shortage of labor. Military service, attractive jobs in defense industries, and the trend of young men away from logging camps the last few years, now present a problem. State employment services in each of these states are attempting to recruit workers, but have not met with much success. Workers are being dropped from WPA rolls to compel them to accept the jobs offered, but it is found many of these beneficiaries are of too high an average age for this rigorous work. Workers drawing unemployment benefits also are being penalized if they refuse to take jobs. Piece work rates have been increased to attract workers. Working standards have reached a higher level than ever before.

S. B. Andrews Ill

BOSTON, Mass., February 16, 1942.—Sumner B. Andrew, of the Boston office of the Monadnock Paper Mills, is temporarily confined to his home in this city by illness.

CONSTRUCTION NEWS

Merrill, Wis.—The Ward Paper Company, manufacturer of sulphite paper specialties, has plans nearing completion for one-story addition, to be used primarily for pulp storage and kindred service. No estimate of cost announced. Proposed to begin work soon. George E. Foster, Jr., 326 Third street, Wausau, Wis., is architect.

Chicago, Ill.—The United Wall Paper Factories, Inc., 330 West Fillmore street, manufacturer of wall papers, has approved plans for new one-story mill on local site at Sixty-sixth and Major streets, and will begin erection at early date. Cost reported close to $60,000, including equipment. General erection contract has been awarded to the A. A. Rose Construction Company, 327 South LaSalle street, Chicago.

Woonsocket, R. I.—The American Paper Tube Company, manufacturer of paper tubing and kindred paper goods, plans rebuilding of portion of plant, comprising annex extension, recently destroyed by fire, with loss reported close to $22,000, including equipment.

Kaukauna, Wis.—The Sangamon Paper Mills, Inc., manufacturer of kraft paper stocks, etc., is completing plans for proposed new addition to mill, previously noted in these columns, and will take bids on general erection contract early in March. It will be two-story, about 48 x 60 feet, used for expansion in main mill section. Cost is reported over $50,000, including equipment. It is expected to begin actual erection early in the spring.

Kalamazoo, Mich. — The Sutherland Paper Company, manufacturer of box board, news stocks and kindred paper products, will carry out modernization and improvements in mill and equipment for increased capacity. Program is estimated to cost about $350,000, with machinery. Primary work will consist of rebuilding of two large paper-making machines, for which priorities have been secured for necessary equipment. Other mill facilities will be provided for the enlarged output. Work is scheduled to be placed under way at early date.

Stamford, Conn. — The New England Foil Corporation, 74 Worth street, manufacturer of metal foil products, has acquired local property on Canal street, and will use as site for new plant. An existing building will be demolished. Plans are being prepared for a one-story struc-

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Hidden Qualities of your paper or board machine may be secured by treating your stock with a Sutherland Single Rotating Disc Refiner.
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PANACEA
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The patented "Floating Blade Principle" of the Lodding Doctor has proved to be a "cure-all" for safely cleaning any paper machine roll that requires doctoring, however the application of this panacea is "prescription-engineered" for each position on every machine. Hundreds of permanent cures prove that "floating" saves power and saves the roll surface from hazards of scoring. . . . May we submit recommendations as to the correct types of Lodding Floating Doctors for various positions on your machines? Write either the Lodding Engineering Corp., Worcester, Massachusetts, or the W. E. Greene Corp., Woolworth Building, New York.

LODDING
FOR EVERY Doctors POSITION

ture, for which it is proposed to ask bids in near future. No estimate of cost has been announced.

Salem, Ore. — The Oregon Pulp and Paper Company, manufacturer of writing papers, greaseproof, glassine and other paper stocks, has plans maturing for a new converting plant for box manufacture on local site at State and Front streets. It will be three-story, about 70 x 90 ft., reported to cost over $50,000, including equipment. Work is scheduled to begin at early date. Bids have been asked on general erection contract.

Phillipsdale, R. I.—Bird & Son, Inc., East Walpole, Mass., manufacturer of roofing and building papers, insulating paper stocks, wall board, etc., has work in progress on new addition to branch mill on Dexter road, Phillipsdale, previously noted in these columns, and expects to have the structure ready for equipment installation at early date. It will be one-story, about 100 x 250 feet, and will be used for expansion in dryer division and other production departments, with part of space to be given over to storage and distribution. Cost reported close to $100,000, including equipment. Erection contract is being carried out by Vappi & Company, Inc., 240 Sidney street, Cambridge, Mass. Ganteaume & McMullen, 99 Chauncy street, Boston, Mass., are consulting engineers.

Chicago, Ill.—Rinco Pulp Products, Inc., recently organized with capital of 4500 shares of stock, no par value, plans operation of a local plant for the manufacture of pulp specialties and paper goods. New company is headed by Orlan Walters and James J. Zimmer. It is represented by Freeman, Sweet & Albrecht, 360 North Michigan avenue, attorneys.

Erie, Pa.—The new mill addition to be constructed by the Hammermill Paper Company, East Lake road, manufacturer of bond and other writing papers, cover stocks, etc., will be two-story, about 53 x 72 feet, instead of one-story, as recently noted in these columns. It will be equipped for expansion in pulp bleaching department, with cost reported close to $50,000, including equipment. The Henry Shenk Company, 1115 Sassafras street, Erie, has the general erection contract. Otto C. Schoenwerk, 3240 North Lake Shore road, Chicago, Ill., is consulting engineer.

St. Louis, Mo.—The F. Burkart Manufacturing Company, 4900 North Second street, manufacturer of felts, pads, etc., has acquired property on McKissock avenue, and will use in future as site for new one-story mill for the production of fiber specialties. No announcement has been made when erection will begin.

Ottawa, Ont.—J. R. Booth, Ltd., 6 Booth street, manufacturer of bond and other writing paper stocks, newsprint, kraft papers, etc., has superstructure under way for one three-story mill addition, previously referred to in these columns, to be about 40 x 170 feet, equipped for general expansion in production division. It is reported to cost in excess of $150,000, with machinery. Completion is scheduled late in the spring. Erection contract will be carried out by the Foundation Company of Canada, Ltd., 1538 Sherbrooke street West, Montreal, Que.

Escanaba Boosts Defense

Employees of the Escanaba Paper Company, Escanaba, Mich., have adopted a payroll deduction plan for the purchase of Defense bonds and stamps, and have set up a goal of $12,000 for the coming year.

The sum of $1,149.75 was subscribed recently under the payroll deduction plan, and cash sales of Defense Bonds to the amount of $1,000 were also made, or a total of $2,149.75 for the first month. At this rate, it is anticipated the goal will be easily attained.

About ninety per cent of the Escanaba Paper Company's 330 employees have now pledged themselves to buy Defense bonds and stamps and the number is likely to increase.

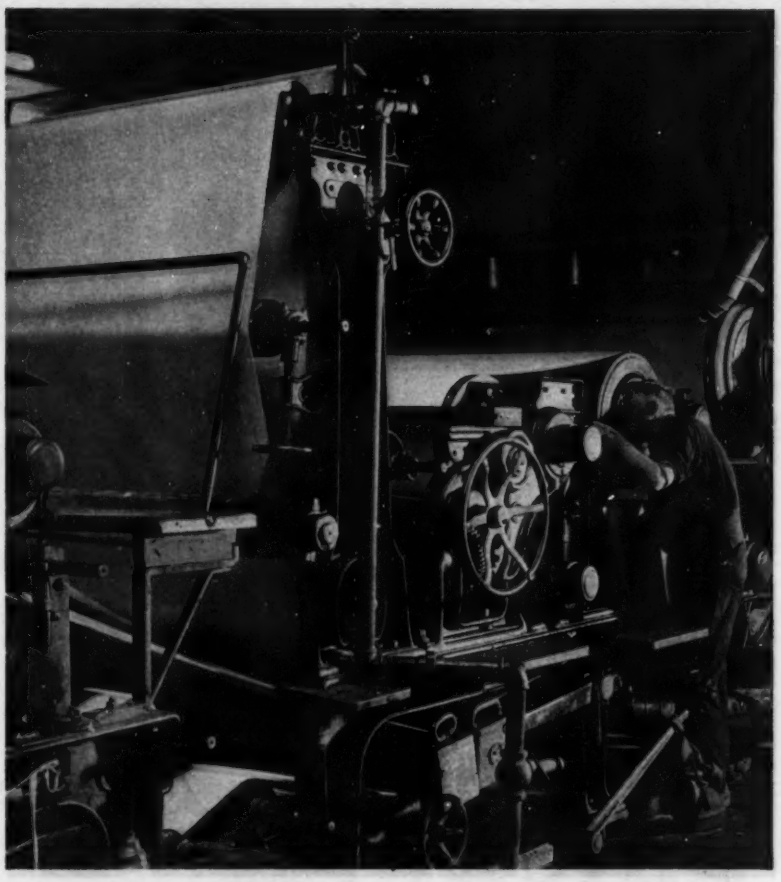
The Escanaba Paper Company Employees Federal Credit Union is sponsoring the sale of the bonds and stamps, with the cooperation of the International Brotherhood of Paper Workers, Local 209, and the International Brotherhood of Pulp and Sulphite Workers, Local 110. The credit union, which has the authority to issue and sell defense bonds, was formed a year ago, and since that time has enjoyed an ever-increasing number of members who are now proud to be able to serve their country in this manner.

A large signboard has been erected at the Escanaba Paper Company plant to show the contributions the workers are making in money and man-power of bonds and stamps sold to date. Small V's on the side of a large V represent the men of the Escanaba Paper Company who have left its employ to serve their country.

No Tissue Shortage

The Tissue Association war-time per capita consumption study related to machine capacity for the industry clears the road of "Hoarding Hurdles" experienced in some other consumer products. Ross A. Fife, executive secretary of The Tissue Association, states that large Government and armed forces requirements have been met with adequate and prompt coverage, and will continue to be adequately met.

Mr. Fife states that some time ago the industry submitted Simplification, Standardization and Paper Savings Recommendations to the Pulp and Paper Section of WPB providing for further savings and safeguards should unforeseen developments occur. Mr. Fife also states that WPB has announced that tissue shortage rumors are false.



The Cylinder Machine in this picture makes the better grades of bristol boards and uses ***Draper Felts.***

But DRAPER FELTS are also designed for all types of paper machines and all kinds of paper.

The cumulative experience of 86 years as woolen manufacturers is reflected in every *Draper Felt.*

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Woolen Manufacturers Since 1856 CANTON, MASS.

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W. L. CAMPBELL, Savannah, Ga.
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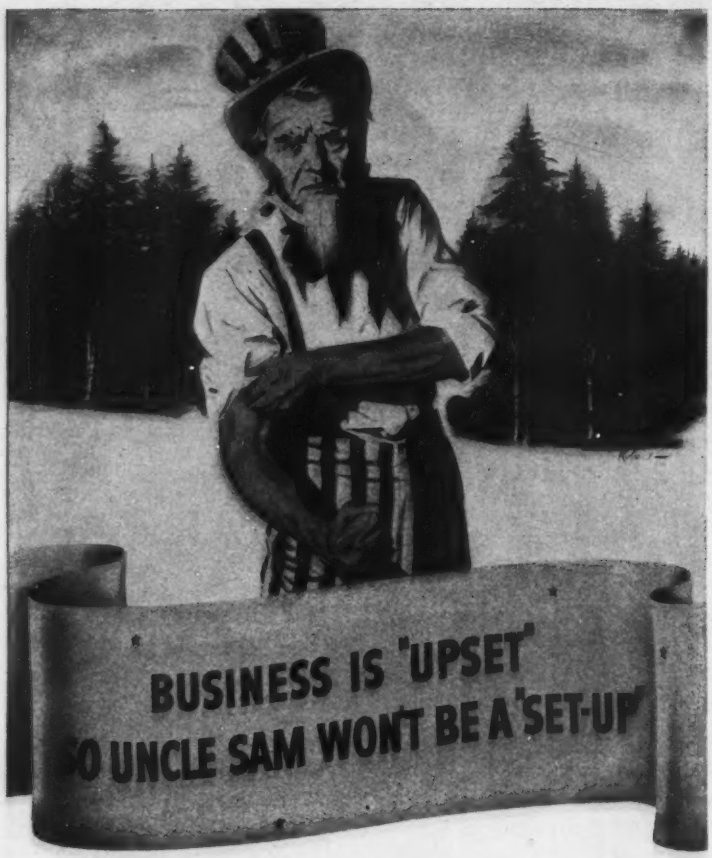

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Paper Men on War Work

Many of the leading executives in the pulp and paper industry of Canada, have taken on war work. Among them, as typical of the spirit that pervades the industry, Lieut.-Colonel G. G. Archibald mentions the following in the Pulp and Paper Magazine of Canada: Harold Crabtree, president of a number of paper companies, who has been president of the Allied War Supplies Corporation since the early days of the war; Lieut.-Col. K. S. Maclachlan, resigned as president of the Fraser Companies to become Deputy Minister of one of the defence department's until a short time ago, when he relinquished that post to go on active service; S. L. de Carteret, vice-president of Canadian National Paper Company, appointed Deputy Minister of National Defence for Air; E. M. Little, general manager of Anglo-Canadian Pulp and Paper Mills, appointed Director of Wartime Bureau of Technical Personnel; R. L. Weldon, now Chairman of Wartime Machine Shop Board; Charles Vining, president of Canadian Newsprint Association, has gone to the Wartime Prices and Trade Board; D. W. Ambridge, Ontario Paper Company, has joined the shipbuilding branch of the Department of Munitions and Supply; J. O'Halloran of Anglo-Canadian Pulp and Paper Mills, has until recently been in the same branch; A. M. Hurter, Lake Sulphite Company, is manager of a huge shell filling plant; Dr. H. J. Rowley and T. L. Crossley are with D.I.L. These are only some of the men of the industry who have taken on the stress and strain of urgent war work.

In the armed services, Brigadier-General J. B. White is in command of the Canadian Forestry Corps; Lieutenant-Colonel Howard Kennedy, Quebec Forest Industries, who has only recently returned to Canada has been overseas with Royal Canadian engineers; Alan Mayhew, vice-president of Sidney Roofing and Paper Company has joined the R.C.A.F.; Major John H. Price and Captain Charles Price of Price Brothers, and Major M. A. Parker and M. T. G. McAulay of Anglo-Canadian Pulp and Paper Mills were among the 55 paper workers serving with Canadian forces who put up such a valiant fight against greatly adverse odds at Hong Kong. It will also be noted that there are more than 2000 men from this industry in the armed forces.

Reduce Water Flow

While water storage for the paper mills and power plants along the Wisconsin River seems adequate for anticipated dry weather periods, the board of directors of the Wisconsin Valley Improvement Company, meeting at the company's offices at Wausau, Wis., last week, decided to reduce the present flow from reservoirs ten per cent.

M. W. Kyle, company manager, announced that 22 per cent more water was in storage than a year ago. Reservoirs are filled to 49.4 per cent of capacity, with a total of 5,940,000,000 cubic feet of water, as compared to 39.6 per cent and 4,878,000,000 cubic feet of water at the same time a year ago. Increasing power demands of the hydro-electric plants anticipated this spring and summer were taken into consideration. Winter precipitation has been light, but is expected to be made up by spring rains.

Married at Madison

Robert De Wilde, a member of the personnel department of Kimberly-Clark Corporation, Neenah, Wis., and Miss Janet Virginia Blumer of Monroe, Wis., were married February 7 at St. Andrew Episcopal church, Madison, Wis. The couple will be at home after March 1 at 917 Higgins Ave., Neenah.

Waste Men to Meet

The National Association of Waste Material Dealers, Inc., for the second time in its history is planning for a wartime convention. The convention dates are Tuesday and Wednesday, March 17 and 18 in New York at the Hotel Astor. From an attendance standpoint the association and its convention and banquet committee are planning for the largest attendance in the history of the organization.

While the President's Party is being omitted this year, in every other respect the convention committee will continue all the features which have made these conventions outstanding for many years. Convention business sessions will be of such interest to demand the attendance of every member of the trade desiring to keep well informed on trade problems.

The association is using a very attractive patriotic sticker which among other things carries in place of the former slogan "You'll Profit From Attending" a new one reading: "Service—Sacrifice—Victory." The complete Convention and Banquet Committee is made up as follows: Carlton B. Overton, Chairman; Sol Ash, Nat. E. Berzen, Sidney Danziger, Wm. F. Ebner, Harry S. Goldstein, Leo Halpern, E. J. Keller, Louis Marcovitz, Julius Muehlstein, Lazarus Muscat, William C. Steck, Lowell S. Thomas, Paul J. White.

A British Dilemma

A sidelight of Britain's current paper shortage is the dilemma in which historians, researcher and social scientists find themselves, according to reports to the Department of Commerce.

The paper shortage menaces historical records in two ways, the report points out. Current paper salvage campaigns have fired some paper collectors with such misplaced enthusiasm that they have fed in valuable documents, particularly of business and historical importance, to pulp machines. Secondly the quality of British paper is said to have declined so dangerously that many of the records being made today will have very little durability. Paper must possess certain fiber qualities and be free from any iron content if deterioration and discoloration are to be prevented. It is alleged that the heavy demands of the aircraft industry had limited the amount of non ferrous sulphate of alumina available for commercial usage, and that it had become essential to assure that available supplies be used in the durability of papers for technical reasons.

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Rolls • Calenders
Are Important Aids to Uniform Quality Paper

Upon the quality of the calender rolls depends, to a considerable degree, the quality of the paper produced. If the rolls are accurate and smoothly finished, if the crown is scientifically correct in shape and amount, and if hardness and depth of chilled body surfaces are uniform, a manufacturing prerequisite to top-quality paper production has been met.

All these qualities are found in Farrel rolls. The results are reflected not only in quality of product, but in the long-lived, trouble-free performance and low maintenance cost of Farrel rolls. They are made in chilled iron, extra-hard "Farreloy" or Farrel Ni-Hard in any diameter from 4" to 72" and any length up to 312".

Farrel Calender Stacks are precision built for dependability and operating convenience. They are made in any size up to 312" long on the face and equipped with chilled iron or hard alloy rolls, automatic gravity feed lubrication, floor-operated lift, heavy box-type housings possessing great stiffness and rigidity, and other modern design features. The calender illustrated is a Farrel 228" stack with electric lift and gravity feed oiling system.

FARREL-BIRMINGHAM COMPANY, INC.
50 State St., Ansonia, Conn.

Pulpwood Men Meet

W. J. Damtoft, of Canton, N. C., again will head the Southern Pulpwood Conservation Association during the coming year. Mr. Damtoft was re-elected president at the association's third annual meeting in Atlanta, Ga.

Elected to the executive vice presidency was R. H. Laftman, Jacksonville, S. C., while those chosen for the executive committee are J. E. McCaffrey, Mobile; P. M. Garrison, Bogalusa, La., and W. E. Penfield, Gulf States Paper Corporation.

Newly elected directors of the association are: T. N. Barron, Franklin, Va.; T. W. Earle, Plymouth, N. C.; Albert Ernest, Savannah; G. L. Snowden, St. Joe, Fla.; C. O. Brown, Mobile; C. E. Smith, Canton, N. C.; W. P. Bulloch, Kingsport, Tenn.; W. D. Comings, New York City; A. H. Stier, Fernadina, Fla., and E. A. Sterling, New York City.

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Electric Propelled INDUSTRIAL TRUCKS
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Capacities 1,000 to 10,000 Lbs.

☆ Center-Control 3000 to 6000 lb. capacity motorized revolving paper roll handlers.

Heavy-duty, center-control fork trucks—telescopic tilting, tiering type for low-cost roll storage and transportation. Capacities 3000 to 6000 lbs.

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☆ Chisel type pulp handlers for box-car loading, unloading and stacking.

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AUTOMATIC TRANSPORTATION CO.
65 W. 87th St. CHICAGO, ILL.

Deliveries Improve

INDIANAPOLIS, Ind., February 16, 1942—No diminution in paper demand has occurred here during the last week, with all lines being firmly held in price. Local jobbers are somewhat encouraged with deliveries, which are coming from the mills in better shape than has been the rule for some time. Local manufacturers also say they are receiving more raw material stock, but the situation in this respect is far from ideal.

Some specialty manufacturers in this section have been forced to curtail their production because of low raw material deliveries.

Newsprint demand last week continued good, but there is a tendency on the part of publishers to conserve paper wherever possible. For instance the largest Sunday paper in the state has cut its rotogravure section from six to four pages. Smaller papers appear to be doing a nice advertising volume in spite of the fact that many items now are off the market, notably automobiles and tires.

Paper boxes and containers continued in good demand with supply fairly adequate. Users of these items are doing all possible to conserve their use against a dire shortage later.

Waxed paper was going well, with most of the demand coming from bakeries and similar users.

Kraft was in good demand with apparently a good supply.

Retailers are attempting to cut down their demands for wrapping paper and bags and one of the largest chain stores here virtually has ceased to use them except when absolutely necessary. Meats and butter continue to be wrapped, all vegetables going into the same bag, but the shopper either brings a basket or shopping bag if he wants to carry canned goods.

Building paper and roofing demand continued to decline somewhat, following a trend that was noticeable shortly after the first of the year.

Mill demand for rags from this territory is reported good with no price changes. Much the same is true of the waste paper demand. Collections in this section have been heavy and fair warehouse stocks are on hand.

New Cleaning Solvent

A cleaning solvent called Gunk X-11 available in the form of a concentrate has been announced by A. F. Curran, Research and Development Chemist of the Curran Corporation.

The marketing of the product is announced at a time when there are far reaching shortages of all chlorinated solvents.

The new cleaning method is carried out by cold immersion of greasy or dirty parts. The new solvent, it is said, not only takes the cling out of hard mineral dirt and grease accretion, but emulsifies them as well, so that they may be instantly and completely rinsed away by sluicing with a water hose.

The removed oil and dirt disappears in the form of a milky oil-in-water emulsion which does not clog sewer drains, or present a fire hazard. The new process, it is stated, makes possible grease cleaning operations on a large scale with little investment in equipment. Only simple rectangular tanks of suitable dimensions, and having an over-all capacity of at least 300 gallons are necessary.

Engineering data sheets are available on request to the Curran Corporation, Malden, Mass.

Recent Customs Decisions

A recent decision by the United States Supreme Court that enemy aliens have no rights of appearance in United States Courts may apply to all cases pending in the United States Customs Courts in which enemy aliens are a party, according to Warren B. Bullock, Manager of the Import Committee of the American Paper Industry. The ruling may also deny to enemy aliens any right of protest in the courts against decisions by Customs officials. The extent to which this decision may involve Customs problems is now being studied by Treasury Department and Department of Justice officials, as well as by members of the United States Customs Court. Enemy aliens are involved in cases already partly tried, cases which have been tried and are before the courts for decision, and to new cases which have just been placed on court calendars. One of the many questions to be decided is whether the ruling of the Supreme Court applies to enemy aliens as individuals or to partnerships or corporations in which enemy aliens have financial interest.

So-called manila newsprint is being classified for duty as wrapping paper at 25 per cent, and not admitted as printing paper at 1/5 cent per pound and 5 per cent.

Customs officials have decided to allow an issue as to the weight of newsprint from Newfoundland to go to the Courts for decision. The paper when weighed by a commercial laboratory under the TAPPI formula was found to be within the maximum 35 pound basis allowed for duty free standard newsprint. The Customs laboratory analysis, however, showed a materially higher weight, and the Court will have to determine which method of testing the paper is correct.

Canadian pulp board has been held dutiable as plain paper board at 10 per cent, and not at the higher rate for supercalendered board. This is in accordance with domestic opinions secured for the Customs officials by the Import Committee.

Canadian 20-point paper board has been classified as plain paper board at 10 per cent, and not as test liner at 20 per cent, in accordance with opinion from the domestic industry secured by the Import Committee.

Light weight bleached sulphite has been classified as sulphite wrapping paper at 25 per cent, and not admitted as printing paper. The importers had claimed the material, apparently waxing stock, to be dutiable as printing paper because it was to be printed before waxing.

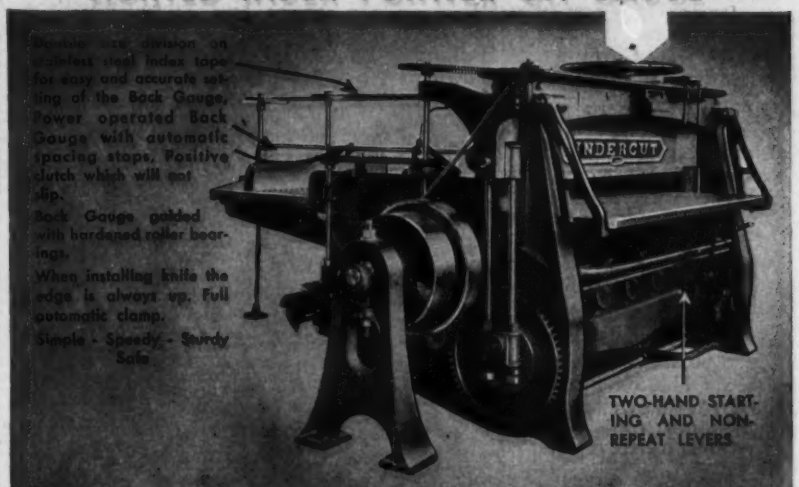
Protest has been filed by a Los Angeles importer against the classification as dutiable rotogravure paper of Canadian paper containing, according to Government analysis, over 6½ per cent ash.

Two shipments of rice paper at Seattle, classified at 30 per cent as paper not specifically provided for are claimed by importers to be dutiable at 20 per cent as non-enumerated manufactured articles.

The same claim is made at Los Angeles as to seven shipments of similar material.

The UNDERCUT Trimmer For Speed and Safety

LIGHTED INDEX POINTER ON GAUGE


Double size division on stainless steel index tape for easy and accurate setting of the Back Gauge.
Power operated Back Gauge with automatic spacing stops. Positive clutch which will not slip.
Back Gauge guided with hardened roller bearings.
When installing knife the edge is always up. Full automatic clamp.
Simple - Speedy - Sturdy Safe
UNDERCUT
TWO-HAND STARTING AND NON-REPEAT LEVERS

New York State Approved two-hand safety starting and non-repeat device ends all danger of accidental starts. Both hands of the operator must be below the cutting table before the knife starts to cut. This advantage, together with that of the power operated back gauge with automatic spacing stops, permits faster production with a minimum of effort.

THE SMITH & WINCHESTER
Manufacturing Company
SOUTH WINDHAM ★ CONNECTICUT

C. J. Kay Honored

Charles J. Kay, head of Columbia Paper Company, and white-haired benefactor of the youth of Vancouver, B. C., was recently formally presented by Mayor J. W. Cornett with the 1941 Good Citizen medal of the Native Sons of British Columbia. Mr. Kay was selected for this award late last year by the committee of this organization which presents one such medal each year.

As president of the Vancouver, Y. M. C. A. for the last five years, Mr. Kay was a leading figure in the planning and construction of the new "Y" building.

Paper Bids and Awards

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 18, 1942 — The Government Printing Office has received the following bids for 788,000 pounds of 38 x 48½ mimeograph paper: Collins Manufacturing Company, 14 cents; Bradner Smith & Company, 11.25 cents; Old Dominion Paper Company, 10.35 cents; Cauthorne Paper Company, 11 cents; R. P. Andrews Paper Company, 11 cents; and Mudge Paper Company, 11.88 cents.

For 30,000 pounds of 25% rag, 8 x 14 white mimeograph paper; and 67,500 pounds of 25% rag, 8 x 10½ same: Old Dominion Paper Company, 11.85 cents; Aetna Paper Company, 11.62 cents; Paper Corp. of U. S., 11.5 cents; Stanford Paper Company, 12.6 cents; Barton, Duer & Koch Paper Company, 11.7 cents; and Whitaker Paper Company, 12.79 cents.

For 170,000 pounds of white sulphite writing paper: Barton, Duer & Koch Paper Company, 6.97 cents; Cauthorne Paper Company, 7 cents; R. P. Andrews Paper Company, 6.79 cents; Paper Corporation of U. S., 7.15 cents; and Marquette Paper Company, 7 cents.

For 1,884,000 pounds of 40½ x 53 safety sulphite writing paper: R. P. Andrews Paper Company, 7.03 cents (800,000 pounds only); Barton, Duer & Koch Company (250,000 pounds only); Marquette Paper Company, 7.5 (500,000 pounds) and 8.57 cents (400,000 pounds); Stanford Paper Company, 11 cents (600,000 pounds only); Cauthorne Paper Company, 7 cents (500,000 pounds only).

Mudge Paper Company has been awarded the contract for furnishing the Government Printing Office with 164,321 pounds of 40 x 54 green bristol board at 5.84 cents. Other awards just announced by the Printing Office for paper, bids for which have been received during the past couple of weeks include the following.

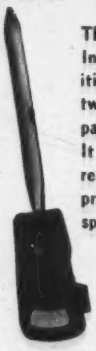
Marquette Paper Company will furnish 44,400 pounds of 32½ x 42½ pink mimeograph paper at 7.75 cents and the Whitaker Paper Company will furnish 100,000 pounds of white sulphite writing paper in 38 inch rolls at 6.9 cents. Mudge Paper Company will furnish 20,750 pounds of 36 x 52 jute tag board at 11.5 cents and the Cauthorne Paper Company will furnish 600,000 pounds of 8 x 10½ ground wood mimeograph paper at 7.95 cents.

The Whitaker Paper Company will furnish 1,900 sheets of 20 x 32 pink gummed paper at $16.06 per M sheets and the Paper Corp. of U. S. will furnish 46,365 pounds of 50% rag, 44 x 64 litho finish map paper at 16 cents. Cauthorne Paper Company will furnish 54,000 pounds of 21 x 32 white mimeograph paper at 7.5 cents, and the R. P. Andrews Paper Company will furnish 200,894 pounds of 48 x 63 white sulphite writing paper at 6.85 cents.

R. P. Andrews Paper Company will also furnish 121,401 pounds of 32 x 42 white sulphite writing paper at 6.85 cents and the same firm will also furnish 33,723 pounds of 32 x 48 white sulphite writing paper at 6.85 cents. The same firm will also furnish 18,391 pounds of 48 x 64 white sulphite writing paper at 6.85 cents.

Paper Corporation of U. S. will furnish 72,000 pounds of 25 x 38 offset paper at 7.63 cents and the same firm will also furnish 193,295

SPOIL SHEETS ARE EXPENSIVE



The Cambridge Printer's Moisture Indicator gives you a quick, positive check of the balance between moisture content of the paper and the air in the shop. It tells you when the paper is ready to run. Its use will save press time, waiting time and spoil sheets.

Send for details of this instrument. It will not only save you time and money but will help get better register.

CAMBRIDGE INSTRUMENT CO., INC.
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CAMBRIDGE PRINTER'S MOISTURE INDICATOR

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Now, when quality and service are so vital to continuous operation, you, too, can rely upon STEBBINS, as do an impressive number of the country's most prominent mills. More than 56 years of experience in meeting specific operating conditions encountered in the Pulp and Paper industry is your assurance of unqualified satisfaction.

SEMCO
Stebbins Engineering and Manufacturing Company
370 EASTERN BLVD. WATERTOWN, N. Y.

pounds of 14 x 19 offset book paper at 8.13 cents.

Whitaker Paper Company will furnish 888,000 pounds of 32½ x 42½ white mimeograph paper at 6.94 cents and the Marquette Paper Company will furnish 88,800 pounds of 22½ x 42½ green mimeograph paper at 7.75 cents. Mudge Paper Company will furnish 40,000 pounds of white M.F. book paper in 36 inch rolls at 6.52 cents and the same company will furnish the same amount of same in 48 inch rolls at 6.52 cents.

The Baxter Paper Company will furnish 40,000 pounds of 25% rag, 32 x 42 white bond paper at 13.85 cents and the Paper Corp. of U. S. will furnish 19,883 pounds of 31½ x 39 white sulphite manifold paper at 11.5 cents. The Whitaker Paper Company will furnish 20,937 sheets of 22⅛ x 32½ white cloth lined cover paper at $113.98 per M sheets. Stanford Paper Company will furnish the same quantity and same size of the same paper at the same price as will also the Mudge Paper Company and the Barton, Duer & Koch Paper Company.

Whitaker Paper Company will furnish 28,275 pounds of 38 x 60 white sulphite writing paper at 7.14 cents and the R. P. Andrews Paper Company will furnish 308,000 pounds of 42 x 58 poster paper at 7.5 cents. Whitaker Paper Company will furnish 80,000 pounds of No. 2 kraft wrapping paper in 9 inch rolls at 5 cents. The same firm will also furnish 80,000 pounds of No. 2 kraft wrapping 36 x 48 at 5.25 cents. The Marquette Paper Company will furnish 24,960 pounds of 38 x 48 white offset paper at 8.3 cents.

Paper Corporation of U. S. will furnish 48,000 pounds of 25% rag, 22 x 34 white bond paper at 13.72 cents and the Butler Company will furnish 80,000 pounds of 25% rag, white bond paper in 24 inch rolls at 13.72 cents. Paper Corporation of U. S. will also furnish 28,500 pounds of 28 x 34 white sulphite ledger paper at 9.75 cents and the same firm will also furnish 31,200 pounds of 24 x 38 white sulphite writing paper at 9.75 cents and 120,000 pounds of 25 x 38 offset book paper at 7.62 cents. R. P. Andrews Paper Company will furnish 80,000 pounds of white sulphite writing paper in 48 inch rolls at 6.79 cents.

R. P. Andrews Paper Company will furnish 40,000 pounds of white sulphite writing paper in 24 inch rolls at 6.79 cents and the same firm will also furnish 160,000 pounds of same in 40 inch rolls at 6.79 cents. Barton, Duer & Koch Paper Company will furnish 80,000 pounds of white sulphite writing paper in 36 inch rolls at 6.79 cents.

Bradner Smith & Co. will furnish 26,000 pounds of 25% rag, 34 x 44 white bond paper at 16.31 cents and the same firm will also furnish 10,200 pounds of 25% rag, 28 x 34 cherry bond paper at 14.6 cents. The Baxter Paper Company will furnish 8,000 pounds of 25% rag, 22 x 34 green bond paper at 14.1 cents and the Resolute Paper Products Corp. will furnish 6,350 pounds of 25% rag, 24 x 38 yellow bond paper at 18 cents. Mudge Paper Company will furnish 43,050 pounds of 25% rag, 32 x 42 green bond paper at 15.65 cents.

Baxter Paper Company will furnish 43,050 pounds of 25% rag, 32 x 42 pink bond paper at 14.4 cents and the Calcasieu Sulphite Paper Company, Inc., will furnish 18,000 pounds of kraft wrapping paper in 36 inch rolls at 4.75 cents. The same firm will also furnish 20,000 pounds of same in 3 inch rolls at 4.75 cents and also 40,000 pounds of same in 16 inch rolls at 4.75 cents.

Just what does it mean?

"A WARREN RECOMMENDATION IS NEVER A COMPROMISE"

★ It means that conditions and the service for which a pump is to be used are carefully studied.

★ It means that we insist upon sufficient information to enable our Engineering Department to make an intelligent and practical recommendation.

★ It means that there can be no compromise on quality to meet a competitive price . . . because Warren has only one quality . . . the best!

★ It means that every piece of Warren Pumping Equipment is engineered to fit the job . . . *YOUR* job.

★ It means ample reserve capacity which is not possible with a "borderline" recommendation.

★ It means, in the final analysis, that Warren Pumps not only prevent costly service interruptions but they accomplish this at the lowest possible operating and maintenance costs . . . based upon actual facts and not theoretical promises.

WARREN PUMPS

Warren Steam Pump Company, Inc., Warren, Massachusetts

PAPER TRADE JOURNAL
This Reg. U. S. Pat. Off.
Henry J. Berger
EDITOR
Vol. 114 February 19, 1942 No. 8

THE YEAR IN PAPER

The American paper industry broke all previous production records in 1941. The total amount of paper manufactured in the United States is estimated at 17,280,000 tons. This exceeds 1940 by 19%. The operating average for the year was 97.3%, compared with 85.6% for 1940. The paper board division reported production of 8,020,000 tons; wrapping paper, 2,925,000 tons, uncoated book paper, 2,020,000 tons; newsprint, 1,058,000 tons; tissue paper, 870,000 tons, and building paper, 853,000 tons.

Newsprint production in North America reached a new high mark in 1941, being 457,000 tons higher than any of three or four previous years. Total North American production was, in round numbers, 4,786,000 tons, of which Canada produced 72%, the United States 21%, and Newfoundland, 7%. The total United States production was 1,014,912 tons, or 0.1% more than in 1940. Mill shipments exceeded production by 37,000 tons, with a corresponding decrease of mill stocks at the end of the year, which were the lightest of any year since 1937. Exports from Canada were valued at $154,356,000, and represented 9.5% of Canada's total export trade of $1,621,000,000. Exports to the United States totaled 2,762,000 tons, an increase of 26%, and 500,000 tons were shipped overseas, which was 24% less than in 1940, due to war restrictions and hazards. Total exports of newsprint from Canada were 95% of production; the ten year average being 93.5%. Consumption of newsprint was, in round numbers, 2,947,000 tons, an increase of 91,000 tons or 3.2% over 1940. Newsprint paper prices remained unchanged at $50 per ton in 1941 and for the first quarter of 1942. Canadian producers have announced a price of $53 per ton for the second quarter of 1942.

Kraft paper production in 1941 set up a new high record. Orders were 22%, production 16% and shipments 19% over 1940. Unfilled orders in December, 1941, were 76% larger than on January 1, while stocks of finished paper at mills declined 25% during the year. Operations were at a high level on January 1, and by April, the industry was operating at maximum capacity, limited only by the supply of pulp available at mills obliged to seek domestic sources of supply, as their usual supply of Scandinavian pulp was shut off by the war. Production facilities are expected to be increased in 1942.

Writing paper production, estimated at 735,000 tons, increased 23% over 1940. At the beginning of 1941, unfilled orders were approximately equal to 10 days' production. Shipments of all sulphite grades of writing paper, such as bonds, ledgers, mimeograph, manifold, papeterie, etc., were 27% higher in tons than in 1940. Shipments to the Government were at the rate of 11% of sulphite writing papers produced; mimeographed paper 25%, meter and chart paper 20%, while rag paper shipments to the Government were 40% of total production; 57% of all rag manifold and more than 30% of all rag content bond paper. Rag content bonds to the amount of 5% of production went to China for currency.

Paper board production was close to 8,000,000 tons in 1941, an increase of over 27% above the 6,276,000 tons produced in 1940. This indicates the output was at the rate of 150,000 tons weekly, compared with 120,400 tons in 1940. Nineteen more board machines were in operation and three mills not previously producing paper board were in production. Container board represented 51.7% and boxboard 48.3% of the total output. Paper board mill activity is based on running time, not on tonnage, and 6 days or 144 hours per week, is the base, equal to 100%. In 1941, the activity was 92%, with a daily average of 27,300 tons, compared with 78% and an output of 25,800 tons for 1940. The average daily production per machine was increased 3 to 4%, due to mechanical improvements and increased efficiency at the mills. The paper board industry consumes about 85% of all waste paper. Increased use of waste paper as a substitute in part for new pulp, created a demand for waste paper in excess of supply. Mills, therefore, inaugurated a program of waste paper conservation involving expenditures of $430,000 to inform the public of the value and need for saving waste paper.

Woodpulp production by United States mills, all grades, aggregated an estimated 9,978,000 tons in 1941, compared with an estimated 8,852,000 tons in 1940 and with 6,993,000 tons in 1939. Preliminary estimates for 1941 indicate that domestic mills produced the following major grades: Bleached sulphite, 2,057,000 tons; unbleached sulphite, 1,544,000 tons; bleached sulphate, 755,000 tons; unbleached sulphate, 3,773,000 tons; soda, 632,000 tons; semi-chemical and other grades, 209,000 tons. In addition, production of groundwood pulp, including screenings, totaled 2,077,000 tons. Actual consumption, all grades, is estimated at 11,068,000 tons. United States imports all grades, total 1,145,000 tons; exports, 322,000 tons.

Imports of chemical woodpulp from Canada increased to approximately 900,000 tons in 1941, from 475,000 tons in 1939. Despite the entire loss of Euro-

pean imports, the increased domestic production, plus imports from Canada, have resulted in a further loss in 1941 of only an additional 171,000 tons in the supply situation. The total available supply of pulp for mills who purchase in the open market was on January 1, 1940, 789,000 tons. On January 1, 1941, it was 496,000 tons, and on January 1, 1942, it was 325,000 tons.

New demands of the Government for papermaking grades of woodpulp to be shipped to England, under the Lease-Lend program; to South America, under the Good Neighbor policy, and pulp for nitration purposes for Army Ordnance needs, has created a shortage in woodpulp. Requirements of the Army are estimated to displace about 150,000 tons of sulphite paper pulp per year, one ton of nitrating pulp displacing about 1.4 tons of paper pulp. The plans in effect for allocating the supply of pulp are expected to relieve wide-spread dislocation. The recently issued simplification programs will help the supply situation by eliminating heaviest weights of paper, as will the introduction of old papers. By these conservation methods the general pulp supply will be spread out as much as it seems practicable at this date, and it is hoped to keep all mills in operation in 1942.

Solving the Supplies Problem

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., February 16, 1942—Salvaging campaigns, not to save dollars but to solve the problem of dwindling supplies, are being conducted with success in mills of the Kimberly-Clark Corporation, Neenah, Wis.

A company announcement summarizes the movement as follows:

"Employees and management of the Badger-Globe and Lakeview mills of the Kimberly-Clark Corporation have met the problem standing up. Mill-wide meetings have been held to discuss the problem. Department committees were then formed and every item of daily use studied to determine how its life could be lengthened or how it could be reused. One operating employee in the Lakeview mill suggested that all waste and scrap that went daily to the junk dealer or to the fire hole be sorted and analyzed. This suggestion alone has resulted in vast salvaging and reuse of materials that were once thought worthless.

"At the Badger-Globe mill, hundreds of pounds of iron, banding iron, paraffin, asphalt, and gummed tape which formerly was junked are now reclaimed. Wrappers on incoming rolls are carefully removed and returned for re-use. Even nails and copper tacks are re-used until nothing more can be done with them. Then only do they become junk. In this connection, research departments are constantly at work to devise substitute ways of achieving desired results.

"The emphasis in this movement at all times is on conservation of materials, not on the dollar saving. Often it costs as much to repair a broken gear or shaft as a new shaft or gear would cost, provided it could now be bought.

"The objective is to preserve jobs, running schedules, and earnings."

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE MONTHLY SUMMARIES

Current Weeks, 1942		Corresponding Weeks, 1941	
January 3	101.8	January 4	80.8
January 10	103.2	January 11	87.1
January 17	103.9	January 18	86.3
January 24	104.1	January 25	87.4
January 31	103.2	February 1	86.4
February 7. (Preliminary)	*104.1*	February 8	88.6

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July
1940	89.1	84.7	82.3	84.3	90.0	92.1	85.3
1941	85.6	89.7	92.2	96.0	98.7	99.3	94.2
1942	*103.9*	...	...	...	...	...	...

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1940	85.1	81.5	85.5	84.9	80.9	85.6
1941	101.0	99.7	105.2	106.0	100.7	97.3
1942	...	...	...	...	...	...

COMPARATIVE YEARLY SUMMARIES

	1935	1936	1937	1938	1939	1940	1941	1942
Year to Date..	64.9	75.7	89.0	63.9	76.7	89.1	86.1	103.8
Year Average.	69.9	80.4	79.8	71.5	83.4	85.6	*97.3*	...

* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1937	80	86	86	88	85	77	66	74	69	65	55	45	73
1938	54	60	61	57	58	56	57	66	66	70	65	59	61
1939	60	67	71	69	64	67	63	72	74	84	81	71	70
1940	71	70	69	70	76	79	72	74	72	79	77	71	73
1941	75	81	82	83	84	88	86	94	94	99	98	93	88
1942	*102*	..	..	..	..	..	..	..	..	..	..	..	..

Week ending Jan. 3, 1942— 86
Week ending Jan. 10, 1942—101
Week ending Jan. 17, 1942—102
Week ending Jan. 24, 1942—101
Week ending Jan. 31, 1942—101
Week ending Feb. 7, 1942—*101*

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.

Subcontracting for Defense

Production is a vital problem today. Any information which contributes to increased efficiency will be welcomed by every company at present handling defense work; more than welcome to manufacturers who want to obtain defense contracts. "Subcontracting for Defense: A Study Prepared in the Interest of Stabilizing Employment," a report just issued by the Policyholders Service Bureau of the Metropolitan Life Insurance Company, contains such information. This study outlines the methods followed by 28 companies that have been outstandingly successful in meeting the problems of prime contracting or subcontracting. It includes a section on obtaining prime contracts for various types of supplies and equipment required by the Government; describes sources of information on governmental requirements and on procurement setup and procedure. It discusses the administration of and responsibility for subcontracting in the prime contractor's organization, and steps commonly followed in selecting and scheduling work to be farmed out.

The report also shows a variety of sources which primary contractors use to locate and contact subcontractors, and methods adopted for appraising their facilities and skill.

The procedure followed in obtaining a subcontract is thoroughly covered in the report by a presentation of details of the methods used by successful subcontractors. Some of the other points covered are: the assistance typically given by the prime contractor to the subcontractor, production control procedures for both the prime contractor and the subcontractor, and the basis for pricing subcontract work.

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INTERSTATE CORDAGE & PAPER CO. PITTSBURGH, PA.

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VICTORIA PAPER & TWINE CO.
TORONTO CANADA

A SERVICE IN PAPER AND TWINE THAT WAS ESTABLISHED IN 1855

HOLLINGSWORTH & WHITNEY COMPANY

Paper Manufacturers

BLEACHED AND UNBLEACHED SULPHITE AND SULPHATE PAPERS
MANILAS, TAGS, INDEX, ENVELOPE, WRITING
MULTI-WALL BAGS
WAXED PAPERS

OFFICES:
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New York
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TRADE MARK

MILLS:
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Madison, Maine
Mobile, Alabama